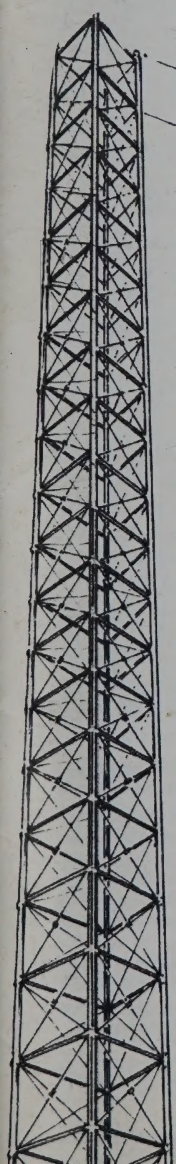
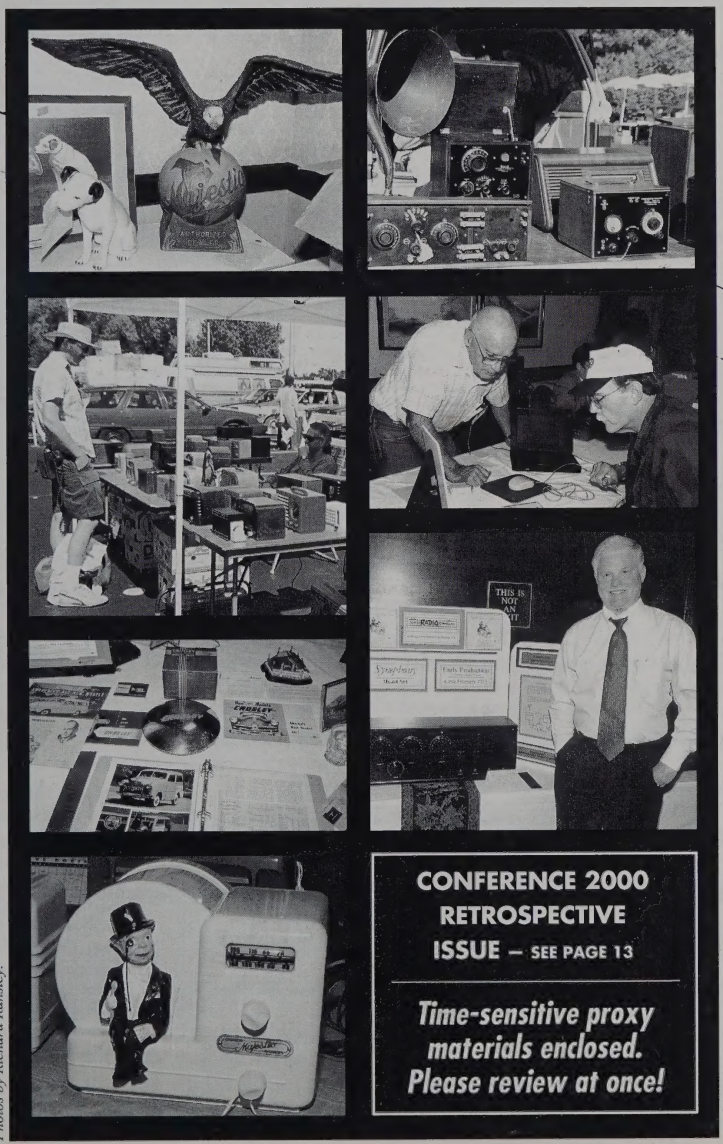
THE OTB

THE OLD TIMER'S BULLETIN NOVEMBER 2000 VOL. 41 / #4

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator





Photos by Richard Ransley.

CONFERENCE 2000 RETROSPECTIVE ISSUE – SEE PAGE 13

Time-sensitive proxy materials enclosed. Please review at once!

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.
BRUCE L. KELLEY 1914-1997, FOUNDING EDITOR

OFFICERS
President.....William B. Fizette, W2DGB
1st V.P......Ron Frisbie
2nd V.P.....Geoffrey Bourne
Secretary.....Joyce Peckham
Treasurer.....Stanley J. Avery, WM3D
Curator.....Ed Gable, K2MP

DIRECTORS
Stanley J. Avery, WM3D
Lawrence F. Babcock
Geoffrey Bourne
Hugh J. Davey
John H. Dilks III, K2TQN
Marc Ellis, N9EWJ
Christian R. Fandt
William Fizette, W2DGB
Ronald Frisbie
Edward Gable, K2MP
Richard Neidich
Joyce W. Peckham
Lauren A. Peckham
Allan Pellnat
Thomas Peterson, Jr.
Richard G. Ransley, WA2TLR
Bruce D. Roloson
Robert Schaumleffel, WA2IKS
Elmer Wagner, W2BNJ
Morgan Wesson

CONFERENCE COMMITTEE
Chairman.....Bruce Roloson
Programs.....Lauren Peckham
Auctions.....Walt Buffinton & Ed Gable
Equipment
Contest.....Geoffrey Bourne
Registration...Joyce Peckham
Photos.....Richard Ransley

HONORARY MEMBERS
Charles Brelsford, K2WW
Anthony Constable
Grote Reber
Elliot Sivowitch

REGIONAL MEETING REPS
Arizona.....Chuck Brelsford, K2WW
California.....Floyd Paul, W6THU
Canada.....Fred Hammond, VE3HC
D.C. Area.....Paul Mooney, K4KRE
Florida.....Norm Smith
Indiana.....Ross Smith
New Jersey.....John Richardt, W2WIY
New York:.....Lauren & Joyce Peckham
Carolinas Chptr.:....Ron Lawrence, KC4YOY
Texas:.....Chevie Crandell (Dallas)
David Moore (Houston)

AWARDS ADMINISTRATORS
AWA Houck Awards.....Barney Wooters
Bruce Kelley-OTB Award..Bill Denk
Equipment Awards.....Ralph Williams
J. Albert Moore Award.....Thomas Peterson, Jr.
Taylor Award.....Pete Yanczer
Tyne Award.....Lauren Peckham

WEB SITE: http://www.antiquewireless.org

WHOM TO CONTACT

Please write legibly. Enclosing an SASE speeds replies.

DUES AND ADDRESS CHANGES: Joyce Peckham (Secretary), Box E, Breesport, NY 14816, (607) 739-5443; FAX: (607) 796-6230, e-mail: awapeckham@aol.com. Dues: 1 year, $15; 2 years, $27; overseas (airmail), $18. Make checks payable to "AWA."

AWA OFFICIAL BUSINESS: William B. Fizette, (President), RR 1, Box 55, Henryville, PA 18332, (570) 629-0637.

BUSINESS CARD ADS: Robert W. Perry, W2TIX, "Smoke Signals," 131 E. High St., Painted Post, NY 14870.

OTB SUBMISSIONS: Marc Ellis, Editor, *OTB*, P.O. Box 1306, Evanston, IL 60204-1306, (847) 869-5016, e-mail: mfellis@enteract.com.

ORDERS FOR THE *AWA REVIEW* OR BACK ISSUES OF *OTB*: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468.

WANT ADS AND COORDINATION OF SLIDE/VIDEO SHOWS: Richard Ransley, P.O. Box 41, Sodus, NY 14551, (315) 483-9307.

MUSEUM OPERATION: Edward M. Gable (Curator), 187 Lighthouse Rd., Hilton, NY 14468. (716) 392-3088, e-mail k2mp@eznet.net.

ANNUAL CONFERENCE BUSINESS: Bruce D. Roloson, 2 Walnut Place, Apalachin, NY 13732, (607) 625-3031.

FINANCIAL REPORTS: Stanley J. Avery (Treasurer), 5900 Moran Rd., Canandaigua, NY 14424, (716) 784-5109, e-mail: WM3D@frontiernet.net

OTB STAFF

Editor
Marc F. Ellis, N9EWJ

Design & Production
Claudia Gray

Copy Editor
Joseph J. Schroeder, Jr., W9JUV

Web Page Designer
Chuck Schwark

Advertising Mgr.
Robert W. Perry

CONTRIBUTING EDITORS

Amateur Radio
John Rollins, W1FPZ

Below 535
Frank Lotito, K3DZ

Book Reviews
William Denk, W3IGU

Breadboarding
Dick Parks

Classified Ads
Richard Ransley

The Communications Receiver
William B. Fizette, W2DGB

Equipment Restoration
D.K. Owens

Key & Telegraph
Roger W. Reinke

Mics and Men
George A. Freeman

The Museum
Ed Gable, K2MP

Obituaries
Charles Griffen, W1GYR

On the Internet
Chuck Schwark

Radio Reproducers
Dave Crocker

Television
Richard Brewster

The Vacuum Tube
Ludwell A. Sibley

ANTIQUE WIRELESS ASSOCIATION, INC.
BOX E, BREESPORT, NEW YORK 14816

The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

© 2000 Antique Wireless Association, Inc.

CONTENTS

FEATURE ARTICLES

28 **A Structured Approach to Fixing Up Those Nice Old Radios** ..... **Bill Fizette, W2DGB**
4—More Test Gear...Identifying Components...More Study.

32 **Explosive Charges Fell NSS Antenna Farm** ..... **Pete Sypher, KC4SI**
Three of the original 19 Towers spared...for the time being.

39 **Tube Lore: "Make vs. Buy" at RCA—Part 2 (Conclusion)** ..... **Ludwell Sibley**
Outsourcing examined on a family-by-family basis.

47 **70.7-Volt Transformers For Output Applications** ..... **Bill Tipton, K5JRI**
Common line-to-voice-coil...Unit doubles as an output transformer.

52 **Grid Leak Detection in the 1920s—Part 1** ..... **Dr. Hugo Holden**
An analytical approach to a usually empirical decision.

57 **Radio as it Used to Be** ..... **Paul Bohlander, W3VVS**
Paul shares boyhood memories from the 1920s and 1930s.

61 **The SCR-68 and Its Vacuum Tubes** ..... **Bernard Magers**
Lee deForest's seminal invention takes to the air.

2000 CONFERENCE RETROSPECTIVE

13 **The 2000 Annual Conference: One Man's Impressions** ..... **Ted Babcock**

16 **Annual Conference Auction Report** ..... **Staff**

21 **Annual Conference Awards Report** ..... **Staff**

26 **Annual Conference Candids** ..... **Dick Ransley**

COLUMNS

11 **The Communications Receiver** ..... **William Fizette, W2DGB**
Restoring A Classic National NC-100 Receiver

29 **Television** ..... **Richard Brewster**
The Diminutive Echophone Model 41

34 **Breadboarding** ..... **Richard A. Parks**
Neutralizing—How does it work?

36 **Below 535** ..... **Frank Lotito, K3DZ**
The Cape Breton Stations of the Marconi Transatlantic Radio Service Part 2, by Henry Bradford

41 **The Vacuum Tube** ..... **Ludwell A. Sibley**
New Alan Douglas Book; 100 mA Series String Tubes; Tubes at Rochester

43 **Amateur Radio** ..... **John F. Rollins, W1FPZ**
Upcoming Events: Bruce Kelley 1929 QSO Party; Linc Cundall OT CW Contest

44 **Radio Reproducers** ..... **Dave Crocker**
Utah Ship Speaker

45 **Mics and Men** ..... **George A. Freeman**
The Mic: Rockwell—The Man (and Woman): Guy Lombardo and Ruth Lyons

48 **Key and Telegraph** ..... **Roger W. Reinke**
Franklin L. Pope—Telegraphic and Electrical Engineer Part 2, by John Casale, W2NI

56 **On the Internet** ..... **Chuck Schwark**
Antique Television on the Web

58 **Recent Radio, TV and Entertainment Obituaries** ..... **Charles S. Griffen, W1GYR**

63 **Equipment Restoration** ..... **Ken Owens**
Miscellaneous Topics

DEPARTMENTS/CLUB NEWS

4 President's Message
4 Letters to the Editor
5 From the Editor
7 OTB on CD Announcement
8 AWA News
20 AWA Review Vol. 13
38 Silent Keys
63 About Our Authors
64 Business Card Ads
67 Classified Ads
71 *OTB* Back Issue Ordering Information
72 The Museum — Back Cover

THE PRESIDENT'S MESSAGE

The AWA 39th Annual Conference is now history, and just about everyone was impressed at how smoothly it went. The fire marshals came on Wednesday morning, checked out the fire lanes and departed satisfied, to our great relief. The hotel took aggressive action to control the parking situation, and the AWA again provided a shuttle service for those who were not registered at the Marriott. For the first time in recent years parking was under control, and we heard little in the way of complaints.

The weather was fantastic. The flea market spaces were sold out, the programs went forward flawlessly (or so I was told), the banquet hall was full on Friday night, and everywhere there was activity. I am told that the registration was 981. All this did not come easy, and we all owe a special "thank you" to Bruce Roloson, the Conference organizer, and to his dedicated assistants, most of whom have been doing the same jobs for years.

On another matter, enclosed with this *OTB* you will find a proxy, which you may use to indicate your wishes on the specified matters to be balloted on in the membership meeting to be held on November 5. On the reverse side of the proxy is a letter from the directors and trustees explaining in detail the need for this action. If you wish to take advantage of this opportunity, please complete and return the proxy in the envelope provided as soon as possible.

The coming year promises to be a busy one for the AWA management and board. At the top of our list of extraordinary projects is the need to complete our application for a permanent charter for our museum under the NYS Board of Regents. To see us through this operation, already under way, we have hired an attorney who is a specialist in non- profit and not-for-profit corporations in New York State. It is a lengthy and involved process, but hopefully we will see it completed during 2001. Ed Gable, our museum Curator, is taking the lead in doing most of the work. We wish him well.

I'm also pleased to report that *The OTB* is now available on a pair of CD-ROM discs! What does this mean? Simply that, if you own these discs, you can access, on your computer, all back issues of *The OTB* from Volume 1 No. 1 (January, 1960) through Volume 37, No. 4 (November, 1996). (Including, of course, all of those scarce early issues.) A searchable index allows you to pick out issues containing topics you would like to investigate. And you can make quality printouts of any page on any decent printer.

The idea for this wonderful addition to the AWA library of publications was proposed by John Dilks, and the discs were created by *OTB* Editor Marc Ellis. Ordering details will be found elsewhere in this issue. Also look for details and ordering information on *The AWA Review* Volume 13, which is now available for shipping.

Again, if anyone wishes to contact me on any matter, I can be reached. I take calls and I answer my e-mail. (Regular mail, please provide a SASE.) Many thanks again to all who have participated so actively in this wonderful organization over the past year.

—Bill Fizette, W2DGB

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

TROUBLESHOOTING FOR BEGINNERS

Have you had some troubleshooting experiences that you think might be helpful to radio restoration beginners? I'd like to use them in my series of articles "A Structured Approach to Fixing Up Those Nice Old Radios." The series is part of an AWA initiative to encourage and assist newcomers to our hobby.

Send me a short letter or e-mail including the radio name and model, the problem(s), and how you resolved them. Include test instruments used and sources or repair components.

Reply to Bill Fizette, RR1, Box 55, Henryville, PA, 18332; E-mail w2dgb@enter.net;

FROM THE EDITOR

Where Are the Restoration Articles?

As President Fizette mentioned in his message, the complete run of *The OTB* from Volume 1 No. 1 through Volume 37, No. 4 is now available on a set of two CDs. More information and purchasing instructions for these long-awaited disks will be found elsewhere in this issue. What's on my mind right now is something that came to my attention while I was preparing those CDs for publication.

As recently as perhaps six years ago, *The OTB* was carrying a good number of articles on hardware-related topics. Today, though we still do run a few transmitter and receiver construction articles, articles on restoration of vintage gear are few and far between. On top of that, Restoration Editor Ken Owens has had to take a pass on his column at least twice this year for lack of reader input. Yet, keeping my ears open at our Rochester Conference this year, I'd say that restoration and restoration techniques were among the most discussed subjects in the corridors.

A couple of personal examples: I had purchased an HQ-120 receiver at the flea market and put it in my van. Later that evening, I went back and opened the rear hatch to put something else in. Within moments, first one person than another materialized in the half-deserted parking lot, scoped out the receiver, and began offering advice about how to straighten it out. The resulting discussion lasted about a half-hour, and I went away with some really valuable tips.

One evening, I offered a 7:30 p.m. talk for beginners on the evolution of the radio receiver. And to make the session even more useful to our neophyte members, I had recruited President Bill Fizette to be present to answer restoration questions. As soon as the meeting was opened for questions, there was a barrage. Bill and other experienced restorers in the group were answering them as fast as they could talk. And the spirited discussion would have gone on well into the evening had we been able to allow it to.

I think that, if we could take an accurate poll, we would find that restoration is what the hobby is all about for a vary large percentage of our members. So why aren't we seeing more restoration features in *The OTB* and why have restoration tips for Ken Owens' column become so scarce? Well, I wish you would tell me!

You might be tempted to blame my editorial policies, since I have been at *The OTB's* helm for close to five years now. But if I'm doing something to discourage restoration articles I can't imagine what it might be. Restoration is certainly a strong interest of mine, and I rarely reject a member article on *any* antique radio subject if it is well organized and lucidly presented.

In fact about a year and a half ago, when it was decided that AWA should revive and offer the old Antique Radio Club of America J. Albert Moore award (ARCA was merged with AWA several years ago), I lobbied hard to see that it was recast as a prize for an outstanding hardware-oriented article or series of articles. Dick Parks, our "Breadboarding" columnist, was the first recipient and Ken Owens was the second. Next year it could be you!

So get busy and work on those restoration articles. And, if not, at least write me and let me know what's stopping you!—*MFE*

Phone 570-629-0637. If you do not wish your name mentioned, I will respect your privacy.

BILL FIZETTE, W2DGB
Henryville, PA

RADIO RECEPTION REGULATION

In the May "Letters" column, Donald Chester states: "Ever since the early days of radio, the U.S. government has regulated the *transmission* of radio signals, but until a few years ago there was no attempt to regulate radio *reception* in this country."

However Clinton DeSoto's *Two Hundred Meters and Down*, the standard history of amateur radio, contains information to the contrary. On p. 50, there is the text of an April, 1917 letter sent to all licensed amateurs. Because of the entrance of the United States into World War I, the letter directs "the immediate closing of all stations for radio communications, both transmitting and *receiving*" (my italics). In addition, all amateurs were directed to drop their antennas to the ground and disconnect their equipment from both antenna and ground. The directive remained in force until past the signing of the Armistice.

Also, currently, there are laws in some states banning the use of police radar detectors *(and/or police radio transmission—Ed)*. In the same issue, a letter from Tesla buff Mike Twose says that "Hertz told Marconi that he was wasting his time experimenting with radio." If such a communica-

tion took place, I've never seen it noted in any history of Marconi, Hertz, or wireless telegraphy.

A. DAVID WUNSCH
Belmont, MA

WIRELESS POWER TRANSMISSION CONTROVERSY

In answer to Henry Bradford's letter (August, 2000 "Letters") requesting sources of information on Tesla's claim of wireless power transmission, see the following:

Patent #645,576, March 20, 1900, beginning on p. 2, line 55, reads: "...it becomes possible to transmit... electrical energy not merely in insignificant quantities, such as are suitable for the operation of delicate instruments and like purposes, but also in quantities suitable for industrial uses on a large scale up to practically any amount and, according to all the experimental evidence I have obtained, to any terrestrial distance."

Patent #1,119,732, Dec. 1, 1914, beginning on page 2, line 20, mentions "...tens and even hundreds of thousands of horsepower."

It is obvious that Tesla was not using conventional radio technology. His dome-shaped antenna was not like anything used for radio transmission either before that time or since. Tesla was only one of many experimenters and radio pioneers to discover forces that are still not included in conventional texts.

As an example, there is no explanation for the operation of the Faraday or "homopolar" generator though it was discovered in 1831 and units for use in welding have been produced.

An electrical impulse will travel along a wire faster than the speed of light which, according to Einstein, cannot happen. If the impulses are very powerful, like those used by Tesla, unconventional effects can be observed.

Since Einstein's view of the universe is the accepted one, any discussion becomes impossible. We have, therefore, a peculiar situation where effects can be demonstrated, (and even equipment bought), that do not exist according to accepted science and technology.

The main motive behind the development of radio technology was to obtain something that was practical and commercially valuable. In this process a unknown phenomena were occasionally noticed but then forgotten. These odd effects are parts of a totally different physics or technology than what we use today. Unfortunately only a few underfunded experimenters are investigating these 19th and early 20th century discoveries, so they remain largely unknown.

A few more sources:

Future Horizons; P.O. Box 125, Marquette, Mich. 49855, www.futurehorizons.net—catalogue available.

Lost Science by Gerry Vassilatos, Published by Borderland Sciences Research Foundation. ISBN #0-945685-25-4.

Secrets of Cold War Technology by G. Vassilatos. ISBN #0-945685-20-3.

The Homopolar Handbook by Thomas Valone, M.A., P.E. ISBN #09641070-1-5.

The Free-Energy Device Handbook, A Compilation of Patents and Reports. ISBN #0-932813-24-0.

Tapping the Zero-Point Energy by Moray B. King. ISBN #0-0623356-0-6

MIKE TWOSE
Toronto, Canada

This is in regard to the controversy about whether Tesla had transmitted wireless power. Writer Henry Bradford states (August, 2000 "Letters") that on page 193 of his book *Prodigal Genius*, John J. O'Neill says that he deduced this story by piecing together the fragmentary material published in a number of publications.

One of those publications may have been *Statute With Legal Force for the Foundation and Organization of the Nikola Tesla Institute* (dated 1939—five years before O'Neill's book was published). The *Statute* lists the most important dates in the life and work of Tesla. The time-line for 1899 states "Erection of large radio station of 200 kW in Colorado. Wireless telegraphy successfully carried out over distance of 1000 kilometers. Lamps lighted by wireless at a distance of 25 kilometers. Current produced 12 million volts."

The above statement, of course, cannot be held as scientific evidence supporting those who claim that Tesla had achieved wireless power. What first must be determined is the origin of the information stated in the *Statute*.

HARRY GOLDMAN
Queensbury, NY

COAST GUARD RIG INFO STILL NEEDED

You published my photos and query on the Coast Guard receiver and transmitter (February, 2000 "Letters"), but I haven't received a single response. I even wrote to the Coast Guard museum in New London, CT with no response. How about it folks, isn't there somebody out there who can give me some information about these units?

ALTON A. DUBOIS, JR.
67 Peggy Ann Rd.
Queensbury, NY 12804

KUDOS TO RALPH WILLIAMS

A few comments on Ralph Williams's book on Atwater Kent, *The Atwater Kent Radios: AWA Review, Volume 12*. I started reading it a couple of times, but got discouraged because of the volume of material in it. So I tried a new tactic. I started skipping around.

In the pullout sheet that lists all radio sets, I looked for my favorite AK models and noted they were all there. That listing alone had to represent hours, days, and months of effort. (Believe me, I know, because as an editor I've prepared lists for many horn speaker articles).

The horn speaker chapter was short, but adequate to tell the reader about Atwater's venture into this line. The chapter on the Model 50, a radio I'd never heard about, was very informative. The conclusion chapter was nicely done; it was interesting to read about why and how Mr. Kent liquidated his business.

I'm still picking out different chapters to read. The book is well organized and well written. In fact, from what I've read so far, it is a masterpiece. I hope to finish its 320 pages in the next few months.

Ralph must be commended for his labor of love. Certainly, the volume will be seen as a major research tool for the historian, the collector, the technician, and anyone interested in those early years of radio manufacturing.

FLOYD A. PAUL
Glendale, CA

PRESERVATION OF MUCHOW COLLECTION?

Anyone who has attended the Antique Radio Club of Illinois meet (Elgin, Illinois), in past years has had the opportunity to view and enjoy the late Dr. Ralph Muchow's incredible collection. It would be a serious misfortune for all radio historians, researchers and collectors if this collection could not be saved for future generations. I'm wondering if anyone has thought about forming an organization to keep the collection intact.

PHILIP DREXLER
St. Paul, MN

The OTB Is Now Available On Two Compact Discs!

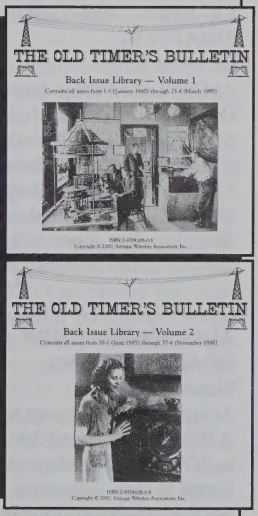
- ***All*** **back issues of *The OTB* from the beginning through 1996 are included.**
- **Any issue is instantly accessible.**
- **Print, graphics and photos are clearly readable on screen.**
- **300-dpi scans allow a crisp, full-size printout of any page (on inkjet, laser, or other high-resolution printer).**

COMPUTER SYSTEM REQUIREMENTS
Any PC or Mac system capable of running Acrobat Reader 4.0
Specific PC Requirements:
- 486 or better processor
- Microsoft Windows 95 or 98, or Windows NT 4.0 with service pack 3 or later recommended)
- 10MB of available hard disc space

CD VOLUME 1 CONTAINS:
Issues 1-1 (January, 1960) through 25-4 (March, 1985). Price: $49.95 U.S./Postpaid in U.S. and Canada

CD VOLUME 2 CONTAINS:
Issues 26-1 (June, 1985) through 37-4 (November, 1996). Price $49.95 U.S./ Postpaid in U.S. and Canada.

BOTH DISCS:
$89.95 U.S./Postpaid in U.S. and Canada.



ORDERING INFORMATION
Send your order to: CD Offer, AWA Museum, 187 Lighthouse Rd., Hilton, NY 14468. Be sure to include your check or money order for the proper amount, making checks payable to AWA. Single disc orders: be sure to clearly indicate volume desired. Add $5.00 per order for postpaid shipment outside U.S. and Canada. Shipment of these CDs will begin approximately mid-November, 2000.

AWA NEWS

***OTB* POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

October 28
CC-AWA Greensboro Swapfest

November 5
Membership Meeting followed by Semi-Annual Board Meeting

November 10-12
VRPS/AWA Convention 2000

December 2
AWA Florida Meet

January 27, 2001
CC-AWA Winter Swap Meet

March 22-24
CC-AWA Spring Meet in the Carolinas

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

CC-AWA GREENSBORO SWAPFEST

October 28

At City Lake Park in Jamestown, NC. Off I-40 in Greensboro, take the High Point Road exit. Head west (toward High Point) 7.5 miles and the park is on your right. Be there by park opening at 7 a.m. because vendors begin to close their trunks around 10:30. Minimal setup fee—no charge for shopping. For more info contact Brad Jones at 336-547-1919 or BandTJones@aol.com.

AWA MEMBERSHIP AND BOARD MEETING

November 5

At Rochester Thruway Marriott. Take Thruway (I-90) Exit 46, then I-390 North to NY 253 West to NY 15 South. Membership meeting at 1 p.m. (open to any interested member) followed by Semiannual Board Meeting.

VRPS-AWA CONVENTION 2000

November 10-12

At the Holiday Inn-Dallas/Fort Worth South (Irving, TX). Use the complimentary shuttle from D/FW airport. Rooms are $69.00, single or double. Three auctions, technical talks, old equipment contest, awards banquet, inside flea market Sunday. For more information contact VRPS, P.O. Box 16345, Irving, TX 75016 or e-mail BILLHAR@FLASH.NET

AWA BRADENTON MEET

December 2

Begins 8:00 a.m.—Stuart Elementary School, 7950 15th Ave. NW, Bradenton, FL. For info, call Norm Smith (941) 792-0003.

CC-AWA WINTER SWAP MEET

January 27, 2001

At Caughman Park, Columbia, SC

(See boxed "With the Chapters" item elsewhere in this department.)

25TH ANNIVERSARY SPRING MEET IN THE CAROLINAS

March 22-24, 2001

At Sheraton Charlotte Airport Hotel, Charlotte, NC

(See boxed "With the Chapters" item elsewhere in this department.)

Recurring Meetings

• California Historical Radio Society—For info on current meetings, call the CHRS hotline: (415) 821-9800.

• CARS, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cinti.) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

• Carolinas Chapter of the AWA—Hosts four "mini-swap-meets" each year (in January, May, July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail kc4yoy@trellis.net.

• Central Ohio Antique Radio Assn.—Meets

at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

• Delaware Valley Historic Radio Club—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a subscription to the club's monthly newsletter *The Oscillator*. For more info contact Bill Overbeck at (610) 789-8199 or Dave Snellman at (215) 345-4248. Club mailing address: P.O. Box 847, Havertown, PA 19053.

• Houston Vintage Radio Association—Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

• Hudson Valley Antique Radio & Phono Society—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

• London Vintage Radio Club—This Ontario, Canada club meets in London on the last Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada. (519) 638-2827.

• Mid-Atlantic Radio Club—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Ed Lyon, 11301 Woodland Way, Myersville, MD 21773-9133, (301) 293-1773, e-mail lyon@fred.net or Membership Chair, Paul Farmer, (703) 960-0650, e-mail: oldradiotime@hotmail.com. Website www.maarc.org.

• New Jersey Antique Radio Club—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

• Northwest Vintage Radio Society—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the society at P.O. Box 82379, Portland, Oregon 97282-0379.

• Oklahoma Vintage Radio Collectors—Meets second Saturday each month, Hometown Buffet, 1012 S.W. 74th St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or call (405) 755-4139 or (405) 732-6070; or e-mail fkarner@mmcable.com.

• Ottawa Vintage Radio Club—Meets monthly (except June and July) in Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

• Society for Preservation of Antique Radio Knowledge—Meets at 7:30 p.m., fourth Tuesday of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $12/year. Write SPARK, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call Dan Gebhart (937) 299-9570.

• Texas Antique Radio Club—Meets alternate months in Kyle and Shertz, TX. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San Antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; website www.gvtc.com/~edengel/TARC.htm.

Call for Papers for AWA Review Vol. 14

Papers are now being accepted for the next AWA Review, to be published in 2001. To expedite matters, a brief summary of the material should be sent to the editor:

Thomas B. Perera, W1TP
11 Squire Hill Rd.
North Caldwell, NJ 07006
tomperera@w1tp.com

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector.

With the Chapters

Things are really getting busy here in the Carolinas. By the time you read this our fall swap meet in Greensboro/Jamestown will be about to happen. I know it will be another great success. The next event on the schedule for the Carolinas Chapter is the Winter Swap Meet that will take place on January 27, 2001 in Caughman Park in Columbia SC. This will be the second year for this event, the first one this past January was a lightly attended due to the sleet and snow storm we had the morning. Let's hope that the "Radio Meet Gods" smile on us in 2001 and we have some of the normally nice weather they have in Columbia in January.

Plans are being finalized for the 25th Anniversary "Spring Meet in the Carolinas" coming up on March 22, 23, 24 2001. We will again be at the Sheraton Charlotte Airport Hotel, the same location for about seven years.

Thursday March 22 will be all-program sessions starting at 1:30 p.m. with Nat Pendelton showing his 1936 RCA TV Field Receiver. Other programs will include a talk on 1920s Homebrews and Kits by Dennis Osborne. Brad Jones will talk about the Care and Feeding of Bakelite and Catlin Radios. Stan Watkins plans to demonstrate the recapping of a 1930s 5 tube chassis. Ed Lyon will talk about Electronic Countermeasures Equipment. There will also be the Annual Membership meeting of the CC-AWA.

Friday morning will start off with a BANG at 8a.m. with the Flea Market, followed in the afternoon by the "Old Equipment Auction." Something "New" to celebrate our 25th anniversary will be a Banquet on Friday evening with entertainment followed by an "open house" reception in the contest room to view the contest entries.

Saturday morning will kick off with more flea market. The Equipment Contest will be judged also on Saturday morning and ribbons awarded. Something we're going to try for 2001 in a effort to attract more "new" people is a special Saturday-only admission of $5. It will only be available at the gate only on Saturday morning. This is hoped to bring in some new collectors and maybe get them interested enough to plan to attend the full event in 2002. So mark your calendars for January and March, we hope to see ya soon. Ron Lawrence kc4yoy@trellis.net 704-289-1166 CC-AWA web page cc-awa.org.

Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, P.O. Box 41, Sodus, NY 14551. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

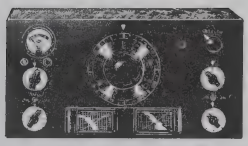
V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine cov-

(continued on page 12)

THE COMMUNICATIONS RECEIVER



EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 55, HENRYVILLE, PA 18332
PLEASE INCLUDE SASE FOR REPLY.

Restoring A Classic National NC-100 Receiver

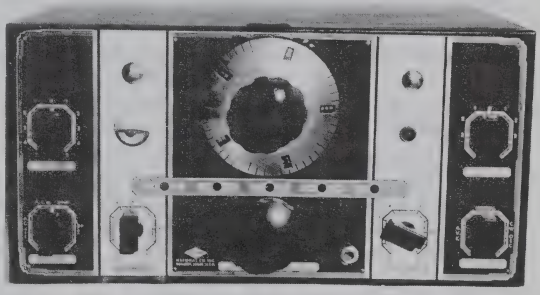
When James Millen and his team at the National Company introduced the NC-100 sliding coil receiver for SWL use in 1936, I doubt that they had any idea of just how successful it would become. In short order, National was filling contracts for government agencies such as the Civil Aeronautics Board. Most of the ships in the US Navy during World War II would have at least one of these designs on board. The NC-101, the amateur version, was very popular with hams for a number of years. If you want to get an overview of the very large number of variants, I refer you to the comprehensive article by Larry Ware in the 1998 *AWA Review*, Vol. 11.

The original design with the red, silver, and black art deco panel, however, probably did not sell all that well, and it is now considered a desirable collector item. Thus, when I had a chance to pick one up several years ago I seized the moment and brought it home. This series of two articles will describe the restoration process in overview, as many of the details have already been covered in prior articles. I will be referring to those, and if the reader does not have a particular issue, possibly it can be obtained from our Museum back-issue department. Alternately, there is now available on CD-ROM, from the same source, most of the back issues. And if all else fails, advertise for what you need and someone will see that you get it.

NOTE: This procedure will suffice for any of the National sliding coil receivers, as the fundamental circuit is the same for all, consisting of a single RF stage, 3 IFs which may or may not include a crystal filter, and usually a heavy duty PP audio output. Because of the heavy current drain, an internal power supply was used.

My first inspection of my prize revealed that, though some service work had been done, it had not been "butchered" and the original power transformer was still in place. However, it was very dirty, and it was obvious that a full recapping job was needed. But before I did anything else, I obtained the circuit diagram from the manual (Riders has it also) and redrew it in standard format so that I could better understand the circuit. While you might be good enough to by-pass this step, I don't recommend it.

Then I found that the main PW tuning dial was frozen in place, and the whole process was stopped! Reluctant to destroy any part of the dial just to get it apart, I eventually devised a means to release the large black knob from the back, and I was able to remove the dial. See the August 1994 *OTB* for details. The cabinet was then dismantled and all hardware was saved in a marked container.



Art deco touches on NC-100 panel refelect its mid-1930s ancestry.

Next, I removed the sliding coil assembly (*OTB*, August 2000), cleaned and lubricated the steel rod, and checked the fiber inserts for smooth action. NOTE: Often these come out of the coil housing casting and are loose on the rod. You may have to clean everything and epoxy them back in place. Also, if the inserts bind on the rod, carefully ream them out to fit. I cleaned the side with the pins (the part exposed to the dirt) and opened up the casting. All the coils were checked by inspection and by running continuity checks.

The main 3-gang tuning capacitor was next. It was obviously in need of much cleaning, so it was removed from the chassis by cutting the wires in the middle. There was rust on the studs,

so the unit was dissembled, the parts cleaned, and then reassembled (*OTB* May, 1992). The gear box was given the usual cleaning and relubricating, with special attention to the main hub to assure that it was still in round (*OTB* November, 1995) so that the PW dial would turn smoothly.

Next, the three electrolytic can capacitors next to the tuning capacitor were removed, cleaned and set aside. They would be replaced for appearance, but not wired back in the circuit. Instead, the wires were snipped; small NEW 22 mfd at 450-volt units would be installed under the chassis when the time came.

The main gray-painted steel chassis was somewhat rusted, but in this case not enough that it needed to be stripped and repainted. It was cleaned and rubbed down with paste wax. If you do have to rework an entire chassis, it is a bit of a job as all the parts have to come off, the unit stripped or sand blasted and then repainted. But if you have a lot of rust, this is the recommended approach. Be careful of the parts, and especially the old wire. It is fragile, and the best approach seems to be to cut it rather than trying to unsolder the connections. I need not remind you to make copious notes during the process, as to where each and every part goes.

Next, with a prayerful approach, I checked the power transformer for continuity and shorts. In this case it appeared to be all right, but it is not uncommon for a transformer to be burned out, or perhaps replaced with a non-original unit. I will discuss a replacement procedure in a future *National Notes* column.

I was now approaching the point where I could begin checking the wiring and recapping the circuit. First, I examined each solder joint carefully under a magnifying lens, checking for bad solder joints. Then I took note of what service work had been done, usually the replacement of a by-pass capacitor or two.

Note that I have not referred to any above-and-beyond procedures, such as filling unwanted holes in the cabinet and the front panel, or removing circuit modifications. All this can be done, often without too much difficulty, but we will not cover it here.

In the next installment we will finish the restoration, including making up a replacement speaker assembly.

AWA NEWS, *continued from page 10*

AWA NETS

PHONE:

SUNDAY:
7244 kHz, SSB, noon (NCS:WA4IAM);
3837 kHz, AM, 4 p.m. (E.S.T.), 4:30 p.m. (during E.D.S.T.) (NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz, SSB, 2:30 p.m. (NCSs KC3YE and W0FXY)
3837 kHz SSB, 8 p.m. (NCS WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:
3867 kHz, SSB, 9:30 a.m. (NCS: W2SHN)
Note: Sometime during December, 2000, net control will pass from W2SHN to Al Roehm, W2OBJ, of Cranford, NJ.

CW:

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up. First **WEDNESDAY** of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 146.820 MHz
Transmit 146.220 MHz

ers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12 — "The Key." (See description for V-6.)

Photos by the author

THE 2000 ANNUAL CONFERENCE: ONE MAN'S IMPRESSIONS

By Ted Babcock

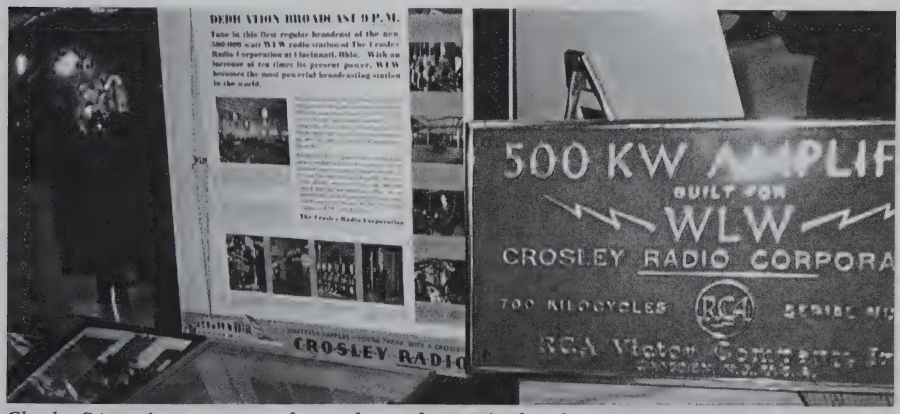
Larry Babcock's very personal impressions of our Annual Conference have become a regular feature on these pages over the past several years. Two years ago, a hospital stay prevented Larry from attending. But twin brother Ted, another dedicated collector and restorer, reported in his place. This year Larry, recuperating from open heart surgery, had to miss the conference again.

At first it seemed that Ted wouldn't be in a position to fill in this time, since it looked like he wouldn't be able to make the conference either. But at the last minute I heard that he would be able to send at least a brief report after all. Thanks, Ted!!—MFE

As I strolled out to the flea market parking lot area at 6:00 a.m. on Wednesday morning, it was dark, cold and rather forbidding. However several hundred hardy individuals were already out there is search of treasures hidden in dark corners of vendor's setups. Perhaps less than half of the vendors were manning their tables, while many spaces were still empty. Eager buyers were swarming excitedly around newly arrived vendors as trunks and tailgates were opened.

I noted several items of special interest, including a rare AK crystal set with Plexiglas cover for $400.00, several AK breadboards, several Kennedy V amplifiers, two Federal Model 110 receivers (at $800.00 & $700.00) and a deForest D-12 with rebuilt Loop Antenna which sold for $400.00. Several vendors had complete collections of catalin receivers at prices too high for my pocketbook. The telegraph boys were also there in force, but I'm not a key collector.

The new rules controlling parking in the flea market area and the off duty police did not seem to dampen buyers' spirits. However a line of cars was parked on Route 15 half way down to the Microtel Motel at Lehigh Station Road. The



Charles Stinger's contest entry featured manufacturer's plate from WLW 500kW transmitter and (far left) chrome ball from top of station antenna. It won "Best of Show" Award.

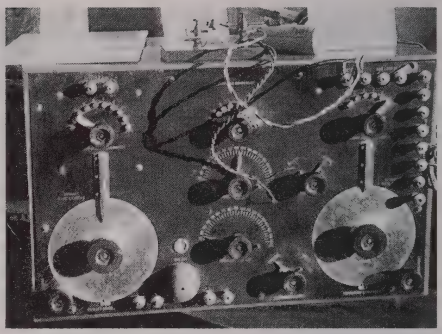
AUTHOR'S ADDRESS: 497 LONG ISLAND DR., MONETA, VA 24121

shuttle buses were parking and discharging passengers at a regular rate, but their availability did not seem to be general knowledge. Cars were not permitted to park on the grassy area between the parking lot and the thruway, but several vendors were set up there, as well as on the grass at the west side of the parking lot.

The old time vendors were there in force including: Ed Bell from Raleigh, NC with his highly collectible stuff, Buford and Jamie Chidester with their rebuilt cone speakers, John and Judy Deloria, Gerry Schneider from Cleveland, and many others. Jim Troe had come in from New Jersey with a nice array of early radios. Two IP-501s of WWI vintage were spotted (made by Wireless Specialty Apparatus for RCA), as well as a WWI aircraft transmitter. A "make believe" model RJ-9 was on display for $550.00, and I saw a Colin Kennedy model 281 with 521 amplifier. Other desirable items were a Grebe CR-5 for $750.00, and a Tuska model 225, with amplifier, for $700.00.

A nice Radiola II was priced at $475.00; an unusual MirRay brand "mirror radio" table model carried an $1875.00 tag, but was later sold in the auction for $900.00; a Clapp-Eastham Radak model C-3 was listed for $700.00. On the morning of the second day John England was seen loading a large (Model 734) Stromberg-Carlson console into his van. Otherwise very few S-C radios or artifacts were seen except for one early battery set with no case or identification (probably early 1-A or 1-B).

The talks were well organized as usual by Lauren Peckham. For me, the most interesting



Early flea market shoppers were rewarded with a look this WWI vintage receiver (an IP-501?).

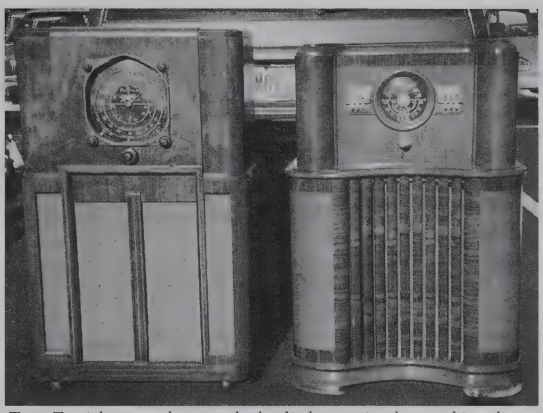
one was "Crosley and Super Power Station WLW" given by Charles Stinger. He presented a short history of how Powell Crosley, Jr. became interested in radio during the early 1920s, then ended up buying Precision Equipment and going on to manufacture all the collectable Crosley radios we have today. WLW had its origins as a 500 watt station in Crosley's home. Power was gradually increased, first to 5,000 and then to 50,000 watts. Eventually the 500,000 watt station went on the air in 1934 and ran until 1939 until legislation was passed limiting all stations to only 50,000 watts.

The fantastic engineering work for the "Nation's Station" was done collectively by RCA, GE and Westinghouse. Charlie had the distinction of working at WLW starting in 1947 after his return from military service. The standing joke for the station's employees was that WLW meant

Jim Troe all set up to deal on some interesting early sets.

"World's Lowest Wages." Charlie's handouts described the station's operation, and also a wide range Crosley products.

The station's name plate, the chrome ball from the top of the antenna and other artifacts were on display in the Old Equipment Contest. The engineering logistics for WLW, which was located north of Cincinnati, were comparable to that of a small city. One notable point was that, in spite of the high radiated power, Charlie didn't remember any person who worked on the transmitter dying early from cancer.



Two Zenith consoles catch the light out in the parking lot.

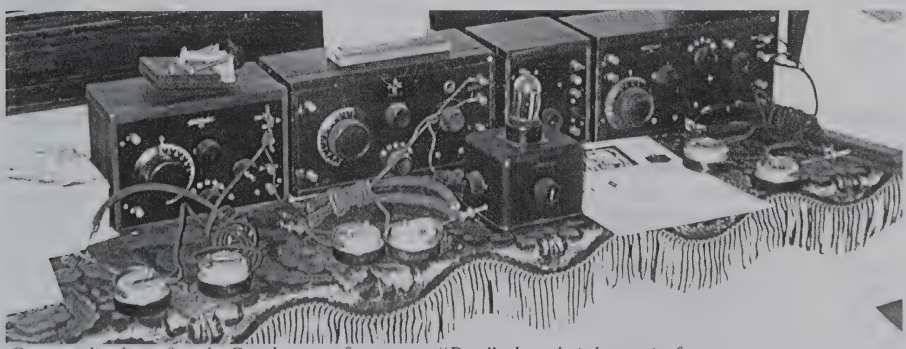
The displays in the Old Equipment Contest were the finest I've had the pleasure to see at any meet. Powell Crosley, Jr. was there as a mannequin dressed in a proper suit of clothes, as was a paper-mache Crosley Lady sitting on her chair. (See *ARC* August, 2000 issue for a description of Crosley paper advertising displays). Many types of Crosley radios and advertising were present, including the early battery radios, Pups, book radios, Bonzo pups, grandfather clocks, cathedrals, etc. The many photos of other Crosley products, such as automobiles, refrigerators and hair restoring machines were also fun to view.

In the general category Ron Frisbie's Golden Leutz receiver was awesome. Peter Yanczer's replicas of early mechanical television devices were also unique and interesting.

I could not attend the Vacuum Tube Auction, which was scheduled at the same time as the check-in for the Old Equipment Contest. I did attend most of the Paper Collectibles and General Auctions. While the quality and variety of items placed in the auction seemed good, the volume must have been reduced from previous years; the General auction, which usually runs until about 5:00 pm on Friday, was over at 2:20 pm.

The auctions were well-attended and prices bid for the equipment items were good, though some items did not meet seller minimums. Ordinary cathedrals and consoles went for $50.00 to $60.00. Several rare microphones brought upwards of $600.00 to $1000.00, while AK breadboards went for $500.00 to $600.00. The most expensive item I saw was the McMurdo Masterpiece with its beautiful chrome radio chassis, 18"speaker and power supply (no cabinet), which sold for $3000.00. See the auction results, printed elsewhere in this section, for a complete review of prices.

The eternal issue of whether Internet sales are responsible for decreased interest and attendance at radio meets did not seem to be the case at this one. Attendance and activity were up to former standards, and quality of items available for sale was good. There's no substitute for getting face-to-face with other collectors from all over the USA and the world, and actually touching the merchandise!



Contest display of early Crosley sets features a "Pup" placed right out in front.

AWA Conference Auction Report

Sale prices from the AWA 2000 Conference auction records, except for results of the tube auction—which are from the records of The Tube Collector's Association. Every attempt has been made to ensure accuracy in reporting these results, but The AWA and The Tube Collector's Association cannot assume responsibility for any errors that may occur.

Results of Communications Equipment Auction

ABBOTT	DK3 XCVR—GOOD; $20.00
BOEHME	CW RECORDER—GOOD; $20.00
COLLINS	R-392 WITH PS—VG; $275.00
	KWM2 W/312B4—VG; $875.00
DOWKEY	DKC-TRM—GOOD; $8.00
DRAKE	T4XB/R4B—NOT WKNG; $185.00
HALLICRAFTERS	SX-62—POOR; $70.00
	HT-32B—GOOD; $70.00
	SX-130—GOOD; $45.00
	S-108—GOOD; $40.00
HAMMARLUND	SUPER PRO XD—GOOD; $120.00
	HQ-129X—FAIR; $100.00
HB	SW CRYSTAL SET—NEW; $90.00
	REGEN—NEW; $180.00
	RX—POOR; $5.00
HOWARD	PRESELECTOR—FAIR; $47.00
INSTRUCTOGRAPH	TAPES—GOOD; $11.00
MCELROY	CODE OSC—GOOD; $22.00
NEMS-CLARK	VHF RX—GOOD; $50.00
NATIONAL	SPEAKER—GOOD; $120.00
	VELVET "B" SUPPY—VG; $75.00
	NC-200—FAIR; $80.00
	NC-57—GOOD; $50.00
	NC-57—POOR; $22.00
RCA	ACR-169—GOOD; $70.00
RME	45—GOOD; $75.00
	LF-90—GOOD; $70.00
STEWART WARNER	RDA3—GOOD; $145.00
SOLAR SYSTEM	6M AM—GOOD; $25.00
SURPLUS	WWII BEACON RCVR—GOOD; $10.00
	BC221AK IN WOOD—VG; $20.00
VIKING	6N2 TX—POOR; $12.00

Results of Paper Collectibles Auction

ADVERTISING AND PROMOTIONAL ITEMS

ATWATER KENT	SIGN; $400.00
CROSLEY	RADIO LOG BOOK; $25.00
	NEON CLOCK; $625.00
MAJESTIC	MIGHTY MONARCH OF THE AIR SIGN; $475.00
MAGNAVOX	SPEAKERS; $675
PHILCO	ANNIE LAURIE'S PHILCO STORY; $8
RCA	NEON TUBE CLOCK; $725.
RCA VICTOR	PAPIER MACHE NIPPER; $250.00
UNKNOWN	KCLO STATION SIGN; $27.50
	1934 AMP CATALOG; $15

BOOKS/MAGAZINES/ETC.

AMERICAN LEONARDO, THE; $50.00
AMERICAN TECH. SOCIETY (2 ITEMS); $5.00
ARRL HANDBOOK (1927); $110.00
BOYS OF THE WIRELESS (WEBSTER); $18.00
CROSLEY RADIO DISPLAY SALES BOOK; $100.00
COLLECTING PHONOGRAPHS AND GRAMOPHONES; $32.50
ELECTRICAL WORLD—3 (1890); $32.50
ELECTRONIC UNIVERSAL; $200.00
EVERYBODY'S RADIO MANUAL (1942); $2.00
EVERYDAY BOOK OF STARS, THE; $60
EVOL OF NAVAL RADIO AND ELECT (GEBHARD); $90.00
FLICK OF SWITCH (MCMAHON); $12.50
HAWKINS ELECTRICAL GUIDE (10 VOL.); $20.00
LANGFORD-SMITH, 4TH EDITION; $40.00
MARCONI; $200.00
NYMPH AND THE LAMP, THE; $15.00
PHOTOCELLS & THEIR APPLICATIONS ; $40.00
PRACTICAL RADIO; $8.00
QST 1933 & 1935; $22.50
RADIO BOYS (3), GIRLS (1); $30.00
RADIO DETECTIVES, THE (REEVES, 1926)
RADIO OPERATING QUESTIONS AND ANSWERS; $2.00
RADIO RETAILING MAGAZINES; $100.00
RADIO SERVICING (1935); $7.00
RADIO SIMPLIFIED (1927); $25.00
RADIO SIMPLIFIED; $20.00
RADIOLA 66 OPERATING INSTR; $6.00
RADIOTRON DESIGNERS HANDBOOK; $60.00
RALPH 124C41 (GERNSBACK); $350.00
RCA SERV NOTES (29-30, 35, 38); $85.00
RCA TUBE MANUALS (3); $20.00
RAYTHEON TUBE MANUF. PHOTOS (BOOK); $22.50
RIDER'S MANUALS (9); $50.00
SIEMENS AEG; $130.00
STERLING RADIO MANUAL $7.00
THOMPSON WATTHOUR METER (1912); $2.00
REFERENCE DATA FOR ENGINEERS; $10.00
TUNGSRAM; $85.00
TUSKA PATENT NOTES; $22.50
VINTAGE TELEGRAPH PHOTOS (42); $25

Results of General Auction

COMMUNICATIONS GEAR

NATIONAL	TUNING GEAR; $9.00
	HRO COILS; $130.00
	XTAL CALIB XC27UE; $17.50
UNIDEN	TRC 458 W/ ASTATIC D-104; $35.00
UNKNOWN	WW2 BRITISH BATHTUB KEY; $55.00
WE	MILITARY FIELD PHONE; $10.00

CRYSTAL SETS

HOME BUILT SET	;$7.23
MINIMAN	ROCKET RADIO (JAPAN); $80.00
PERICAUD	"SOLEIL"; $310.00
RADIO CRAFT	MODEL UNKNOWN; $10.00
SPLITDORF	MODEL UNKNOWN; $400.00
UNKNOWN	RADIO MAIN (FRENCH); $130.00

MICROPHONES

AIWA	AIKO VM-1000 VELOCITY MIC; $373.00
EV	MODEL UNKNOWN; $50
TOSHIBA	TYPE A VOLOCITY MIC. ; $1000.00
TURNER	N450C; $7.00
	355c; $5.00
UNKNOWN	OFFICIAL FRENCH GOVT/RIBBON; $675.00
	MELODIUM 408 RIBBON; $525.00
	DELODIUM 7-5A DYNAMIC; $110.00
VITAVOX	MODEL UNKNOWN; $100
WE	600-A CARBON BROADCAST MIC; $350.00

MISCELLANEOUS

ALTEC LANSING	2 1607A AMPS; $50.00
ATWATER KENT	MODEL 84; $370.00
BRYANT	DEFOREST AUDIO TYPE TUBE SOCKET; $45.00
CROSLEY	1927 SHORTWAVE CONVERTER; $420.00
DAVID GRIMES	1920'S PHONO ADAPTER; $20.00
DEFOREST	INTERPANEL; $200.00
	INTERPANEL; $120.00
	INTERPANEL; $190.00
GE	D. DUCK AND M. MOUSE PHONOG; $32.50
GRUNOW	TELEDIAL STATION LIST; $15.00
KAY	AMPLIFIER; $100.00
MEISSNER	FM TUNER 8C; $15.00
MIRROR-RAY	MIRROR; $900.00
MORRIS	COIL WINDER; $100.00
RAYTHEON	BOX OF ARTIFACTS; $65.00
ROLLER-SMITH	EARLY WATTMETER; $100.00
SABA	REPAIR NOTES; $50.00
STROMBERG	NO. 10 AMPLIFIER; $35.00
TESLA	TALISMAN 308U; $220.00
	TALISMAN 307U; $150.00
UNKNOWN	CROOKES TUBE W/ WHEEL STAND; $450.00
	BRITISH BOMBER KEY; $40.00
	FRAMED LISTING OF US BC STATIONS; $20.00
	HI-FI AMP; $120.00
	MONITOR RECEIVER; $12.50
	PICTURE ANTENNA (1940/50 NOS); $60.00
	PICTURE ANTENNA (1940/50); $80.00
	SWEDISH RELAY; $10.00
WE	7A NO TUBES; $375.00
WESTINGHOUSE	EARLY 1920 LOADING COIL; $110.00
WILSON MFG. CO.	BUZZER PRACTICE SET; $85.00
ZENITH	BANNER; $22.50

RECEIVERS

ADMIRAL	7T09-S; $40.00
APEX	MODEL 7; $60.00
ATWATER KENT	MODEL 20; $50.00
	10C BREADBOARD; $650.00
	DETECTOR-AMP; $252.00
	MODEL 40; $32.50
	#55 CONSOLE; $55.00
	POOLEY 10 BREADBOARD; $575.00
	VARIOCOUPLER RECEIVER; $250.00
BALDWIN	MODEL 50 (1930); $120.00
BOSCH (GERMAN)	UNKNOWN; $90.00
BROWNING-DRAKE	TUNER; $32.50
CROSLEY	5-50 WITH ORIG. BOX; $120.00
	167 CATHEDRAL (1930S); $100.00
	MODEL 58TA RECEIVER; $32.50
	GEMBOX; $45.00
	601; $22.50
CAMUS	BOTTLE RADIO; $22.50
CARLTON	BINOCULAR RADIO; $65.00
DAVID GRIMES	BABY GRAND; $75.00
DEFOREST	D-12; $750.00
	602; $60.00
DELCO	GM RADIO; $25.00
ECHOPHONE	ALL ORIGINAL 3 TUBE RECEIVER; $400.00
EMERSON	POCKET TRANSISTOR RADIO; $22.50
	UNKNOWN; $15.00
	TOMBSTONE; $42.50
FADA	2 BAKELITE: BRWN, WHITE; $65.00
	461L; $70.00
GE	A63; $40.00
	K50P; $160.00
	M-106; $40.00
HOMEBREW	LARGE BATTERY SET; $55.00
JEWEL	VANGUARD TRANSISTOR; $12.00
KENNEDY	MODEL 5; $375.00
KORTING	UNKNOWN; $100.00
LAFAYETTE	UNKNOWN; $32.50
LINCOLN	SUPERHET; $170.00
MARCONI	218; $37.50
MCMURDO SILVER	V1; $3000.00
MAILLARD	CRYSTAL RECEIVER (FRENCH); $1000.00
MEISSNER	THREE TUBE MIDGET; $180.00
MERCURY	SUPER 10; $1250.00
	SUPER 10; $1400.00
MINERVA	TROPIC MASTER; $30.00
NATIONAL	HRO JUNIOR; $160.00

	EG-896; $25.00
	HRO-7; $100.00
	NC98; $17.50
NEUFELDT	301W KIEL; $340.00
NEUTROWOUND	UNKNOWN (1926); $350.00
NORTHERN ELECTRIC	R-11; $500.00
	MODEL 4100 RAINBOW; $50.00
NOVELTY	SUITCASE PORTABLE; $35.00
OMEGA	TYP5PW RECEIVER; $50.00
PENETROLA	MODEL # 4504; $35.00
PHILCO	MODEL 37-610; $70.00
	60/505; $45.00
	90; 520.00
	20; $200.00
	116-121; $70.00
	MODEL 4 SHORTWAVE TUNER; $230.00
	CLOCK RADIO; $25.00
	39-5984; $60.00
	80 JR; $75.00
PHILLIPS HOLLAND	953A (1934); $110.00
	944A (1934-35); $90.00
PILOT	B-1; $50.00
PISTANTONE	MODEL B; $60.00
RCA	RADIOLA 25; $55.00
	RADIOLA III W/ BALANCED AMP; $220.00
	RADIOLA 17; $35.00
	R5; $65.00
	MARLBORO CIGARETTE; $210.00
	3-BOX 671 STRADOWORLD; $110.00
SETCHELL-CARLSON	BC-1206; $5.00
SIGNOLA	MODEL V; $110.00
SILVERTONE	MODEL 4404; $50.00
	6130; $40.00
STEWART WARNER	PORTA-BARADIO 9008B (1948); $120.00
	PORTA-BARADIO; $260.00
	102 & 301 COMBINATION; $70.00
THERMIODYNE	TFG; $200.00
UNKNOWN	TRANSISTOR SET; $18.00
	NOVELTY GRANDFATHER CLOCK RADIO; $15.00
	MODEL 59; $950.00
	REGEN (3/199); $30.00
WESTINGHOUSE	MODEL 16; $90.00
	TYPE RA; $70.00
WORKRITE	KIT; $20.00
ZENITH	UNKNOWN; $140.00

SPEAKERS

AMPLION	UNKNOWN; $240.00
ATWATER KENT	E3; $30.00
H.H. SCOTT	2 WOOFERS; $10.00
MAGNAVOX	HORN SPEAKER; $120.00
MUSIC MASTER	HORN SPEAKER; $190.00
NEWCOMBE	DRUM SPEAKER; $20.00
ORCHESTRION	HORN SPEAKER; $260.00
REALISTIC	NIB; $5.00

TELEGRAPH EQUIPMENT

AT&T	1800S RELAY; $60.00
BUNNELL	PEN RECORDER; $250.00
	SOUNDER HOLDER; $80.00
L.M. ERICSON	TELEGRAPH KEY; $320.00
JAPANESE MADE	BUG; $60.00
MCELROY	TEAR DROP BUG; $170.00
SIGNAL ELECTRIC	KEY AND BUZZER BASE; $22.50
SIGNAL JR.	TWIN R70; $125
SILVERTOWN L	TELEGRAPH RELAY; $510.00
SPEED-X	MODEL 500; $80.00
UNKNOWN	AMERICAN TELEGRAPH PRACTICE (BOOK); $60.00
	CAMEL BACK LEG KEY; $200.00
	BUG KEYS (3); $95.00
VIBROPLEX	KEY, S.N. 86017; $60.00
WE	3C; $25.00

TELEVISION

MOTOROLA	16" CONSOLE; $20.00
PANASONIC	3-WAY POPUP TV/RADIO; $22.50
	TR-205; $10.00

TEST EQUIPMENT

CLOUGH BRENGEL	SWEEP GENERATOR; $7.00
HICKOCK	SET TESTER SG4600; $270.00
SUPREME	400 TESTER; $80.00
	MODEL 333; $22.50
PHILCO	PREDICTA; $160.00

Results of Vacuum Tube Auction

Courtesy Ludwell Sibley and The Tube Collector's Association

Abbreviations:
FOK Filament OK
NIB New in Box
TOK Tested OK (for emission or gm)
WE Western Electric
WU Workingness Unspecified

Arcturus	Wunderlich, FOK; 75
	Arct.-Crosley PZ/47, in poor box, TOK; 20
De Forest	DV-3 w/ can, open; 35
	Spherical Audion, 1 fil. OK, 1 top lead loose; 1150
General Electric	CG-886, NIB; 250
	45s (2), late vintage, NIB; 85
	861 (CG-861), black cap, WU; 40
	7735, used, WU; 10
Miscellaneous	201As (5), Sylvania, TOK; 55
	810s (4), used, FOK; 31
	864s/VT-24s (10), Hytron, NIB; 160
	Bryant brass-shell candelabra socket (for Audion); 45
	Can. Marconi WL-673 Hg rect., WU; 35

Crookes, 1.5" x 10", two side stubs, on stand, w/ internal paddlewheel rotor on track; 450
Crookes, 12" tubular, "T" mtg. arm, lightly sputtered; 75
Delta Midget triode, FOK; 270
Duovac VT-2, NIB; 90
Ergon 245 (2) NIB; 130
Geissler, tubular-globe-tubular bulb 2" max. dia., 10" long, clear bulb, works; 800 Machlett ML-41 X-ray rect., lightly browned, "exc. cond., open fil."; 10
Northern Electric REL1/VT90/710As (2), NIB; 27
Sodion D-21, nice etch, open; 40
Taylor T-55, NIB; 30
UV-199s (6), FOK; 55
X-ray, repro early fixed-anode, 5" spherical w/ long tubular extension, on base; 100

RCA
UX-210, box, WU; 40
250s (2), 1 good / 1 fair; 85
45s (2), RCA Victor, NIB; 110
833A, FOK; 35
UV-199s (2) "employee seconds," NIB; 26

Western Electric
102D, box, FOK (2 lots); 90, 110
102F, FOK; 40
205D w/ 100-type socket (2 lots, both "good" but WU); 270, 300
212D, FOK (2 lots); 375, w/ socket, 550
215A (3), NIB (2 lots); 60, 75
215A, 4 good / 4 duds; 60
216A, box, FOK; 105
407Bs (10), NIB; 10
CW-931, NIB; 210
D-86326 (nongettered 101D), WU; 70
VT-1, FOK; 40
VT-2, FOK; 105
VT-5, NIB; 19
VT-25A, TOK; 50

Westinghouse
672As (6), Hg thyratrons, w/ sockets, FOK; 10
803s (2); 30

Foreign
AWV Radiotron (Aust.) 6AR7GT, ext. lead-foil shield (3 lots); 10, 10, 10
Amperex EL51, "ex. cond.," box; 15
Barretters/ballasts (5), Euro. cer.-base, NIB; 16
Japanese QC780C Hg rect., in box; 21
Lot: 15 Euro. '30s-'40s rcvg., mostly sprayed / slide-base; 180
Lot: Philips D6 & Arcotron (less zinc coating), OF; 250
Lot: Telefunken/Tungsram mins., 50, 1/2 of them boxed; 31
Lot: Wehrmacht - LG4, RV2P800s (9), RL12P35s (2), RV12P2000s (9), RV24T3, RV24P700s (2); 260
Marconi-Osram AT50, box, WU; 80
STC (Aust.) 4205E, WU; 140
Telefunken RL12P35, WU; 20
Telefunken RV218 w/ box, "good"; 100
TKD K1, "gone to air," box; 85

Box Lots
Caddy, large RCA (nice), full, WU; 30
Caddy, Magnavox (scruffy), 200 new/used; 10
Caddy, med., w/ tester inside, undefined; 36
Caddy, large GE, 200 indust. tubes incl. ceramic UHF types; 65
Lot: Eimac med. glass xmtg. types (2); 30
Lot: Westinghouse/GE (23), 1/2 of them boxed, "working"; 10
Lot: 3A photocell & deForest 4-pin tubular "audion," mounted, WU; 20
Lot: 6L5Gs & 6J5Gs (6), 7377, 8417; 20
Lot: 250T, 250R, "105": WU; 30
Lot: 427s (2) & 6 misc.; 30
Lot: 803 (2), 810, 852, WU; 34
Lot: 807 (5) & 6AS7 (9), unboxed, TOK; 10
Lot: 918 w/ box & 931; 15
Lot: 6146, 0A3, 0A4G: 94 in RCA indust. Boxes; 20
Lot: Big-pin (30 each 38s), NIB; 18
Lot: Big-pin (50), reboxed, TOK; 16
Lot: Big-pin (60), boxed; 50
Lot: Big-pin (ca. [70 + 120]), boxed, 2 cartons; 100
Lot: Big-pin (ca. 11): WD-12, UV-200 BB, Rogers AC-32, "D-471," WL-190, C-373, UV-199, 305D: FOK; 220
Lot: DeF DV-3 w/ can, good—unk. Arct. blue—UX-280, good—WD-11, Open; 60
Lot: GL-837 (2) & RK-39, WU; 25
Lot: Octals, 1.3 cu. ft.; 12
Lot: Octals, 36 Philco boxed; 10
Lot: Photocells incl. WE 3A, electrometers; 22
Lot: Mil. magnetrons, small, 1 cu. ft.; 80
Lot: Taylor T-40s (2), 2E26 (2) NIB; 30

THE *AWA REVIEW* VOLUME 13 IS NOW AVAILABLE

The Antique Wireless Association presents for your reading interest a new volume of *The AWA Review*, with some unusual content.

The lead article is by well-known Canadian member Robert Murray, who explores in depth the Canadian Northern Electric manufacturing company and its radio products. The detailed

listings and numerous photos should prove to be of considerable interest to the radio collectors and historians, especially to those who may not have known much about the products of this rarely-mentioned company.

Graeme Bartram of Australia, a relative newcomer to our pages, recounts a little-known legal case that led to the commercial dominance of the Marconi Company in the field of wireless telegraphic communications for many years. He also introduces us to another radio pioneer, John Graeme Balsillie. A key element within the story is the famous Marconi 7777 patent.

Next, Bart Lee, a well-known historian and writer, continues with the Marconi theme by exploring in depth the controversial "three dots" first message from England to Newfoundland on December 12, 1901. While writers over the years have cast doubts on the veracity of the Marconi claim, this paper draws on some little known sources to place this historic event in better perspective, and in the process, provide us with some very interesting reading.

Richard Foster of Cochituate, Mass., and Pierre Demerseman of Paris, France, have joined forces to produce a discussion of radio direction finding, and "Huff-Duff." This World War II secret weapon played a vital role in the Battle of the Atlantic, and was instrumental in reversing the very serious situation in favor of the Allies. Coupled with a history of radio direction finding, the authors explore the significant work of French engineer Henri Busignies, including details of his related patents.

Writer Pamela Grundy, of Charlotte, NC, who is well known to the members of the AWA Carolinas Chapter for her interest in early radio, has offered for our reading pleasure the early history of Charlotte's radio station WBT. The challenges facing the early radio station pioneers as the industry developed are reflected in this lively tale.

Following through on early radio stations, George Freeman, well known within AWA circles, tries his hand at authorship by exploring the theme of just how these pioneer stations came into being in the fledgling industry, and how some survived while many did not. Appended is a comprehensive list of these early stations, which, the author assures us, is still developing.

The AWA Review Volume 13 is available now for US$19.95, postage paid in U.S. and Canada, by writing to: AWA Museum, 187 Lighthouse Rd., Hilton, NY 14468. Overseas orders add $5.00. Make checks payable to AWA Museum. 155 pages, 107 illustrations, soft cover.

AWA Conference Awards Report

All photos by Dick Ransley.

The AWA Recognition Awards

These awards are traditionally presented on the last evening of the conference at the gala "Historical Banquet." Nominations for six of the awards are solicited from the AWA membership at large, and each winner is selected by a special committee charged with administering that particular honor. The awards and their 2000 winners are:

The AWA Houck Award for Documentation goes to an AWA member who has written several original articles on radio development or history in the *OTB, Review*, or other publication. (This can include a book on a related subject.) *Not awarded this year.*

The AWA Houck Award for Preservation is for a member who, through personal accomplishment, has acquired, and preserved by documenting, an outstanding collection of radio artifacts.

Fin Stuart (with Tyne Tube Award plaque) and wife pose with noted tube collector Al Jones, who has just made the award presentation.

Ken Owens (left) receiving J. Albert Moore Award from award committee chairman Tom Peterson.

Not awarded this year.

The Bruce Kelley-OTB Award is given to the member who publishes in the *OTB* an article judged to be the most outstanding, original, historical presentation of the award year. For this year, articles in the August and November, 1999 and the February and May, 2000 issues were considered. *Winner: James P. Rybak, W0KSD, for his article "'Forgotten' Pioneers of Wireless, Part 5—Karl Ferdinand Braun" (August, 1999 issue).*

The J. Albert Moore Award comes to us through the Antique Radio Club of America, which was merged into AWA a few years ago. The award honors Mr. Moore's contributions to ARCA. As given by the AWA, it recognizes the article, or series of articles, deemed to be the most outstanding of those dealing with radio hardware (radio sets, radio systems or components) printed during the award year. The issues considered are that same as those considered for the Bruce Kelley-OTB Award. *Winner: Ken Owens for his series of restoration articles in* The OTB.

The Taylor Award, in memory of John Taylor, RCA TV Developer, is for "preserving television history." *Winner: James P. Rybak, W0KSD, for contributions to the documentation of the history of television.*

The Tyne Tube Award is presented, in remembrance of Gerald F.J. Tyne, for contributions to preserving or documenting the history of tube technology. *Winner: Fin Stewart for his publications and his outstanding collection of vacuum tubes and valves.*

The two additional awards traditionally given at the Historical Banquet are:

The President's Award for outstanding service to AWA this year: *to William E. Denk, W3IGU, for his dedicated, long-term chairmanship of the Bruce Kelley-OTB Award committee.*

The Linc Cundall Memorial Award is presented to the winner of the Linc Cundall Memorial Old-Time CW Contest: *Bob Raide, W2ZM.*

Contest Recognition Awards

Also presented at the banquet this year were the major old equipment contest awards:

The Eunice Thompson "Best of Show" Award. *Winner: Charles Stinger for his WLW*

History 500 KW Transmitter Display.

The Display Award. *Winner: Jim Wilson for his Crosley Grand Old Lady Statue.*

The Elle Craftsman Award. *Winner: Bill Holly for his Crystal Receiver.*

The People's Choice Award (decided by visitor's ballot). *Winner: Jim Wilson for his Crosley Grand old Lady Statue.*

AWA/ARCA Houck Superheterdyne Award: not given this year.

Matlack Transmitter Award: not given this year.

2000 Old Equipment Contest Winners

Compiled by Contest Coordinator Geoffrey Bourne

THE CROSLEY THEME CATEGORIES (1 through 9):

Category 1: The 1920s

1st Robert MacIntyre and Bob Murray
Crosley 50,51,51A,52

1st Ed Bell
The Harko Senior Sets.

2nd George Freeman
Harkness, RFTA, 51,51-A,50,50-A

3rd Robert Betz
Crosley Shortwave Converter and Component Xtal Set

Category 2: The Metal Box Sets

1st R W Schaumleffel
Bandbox Jr. w/ box and papers

2nd Robert Betz
Crosley Model 176

Category 3: Cathedrals and Tombstones, the 1930s

1st Jim Cross
Crosley Playtime 124 and Oracle 59 grandfather clock radio

2nd Frank Feczko
Crosley 170 Dual ten Lowboy Console

3rd John Garrison
Crosley Playtime Grandfather Clock Radio

Category 4: The Crosley Fiver and Super Eight

No Entries

Category 5: Speakers

1st Fred Crew
Crosley Super and Ultra Musicone

Category 6: Television

1st Jan and Pete Grave
Crosley 7 Inch Portable TV

Category 7: Company History

1st Charles Stinger
WLW 500 KW Transmitter Plaque

2nd George Freeman
Hymns of All Churches WLW Radio Program Display

Category 8: Advertising and Customer Documents

1st Jim Wilson
Crosley Grand Old Lady Statue

2nd Robert Betz
The Crosley Band

3rd Robert Lozier
Crosley Ads "When the Crown Stands or Falls"

Category 9: Other Products

1st George Freeman
Army RM-29, Temperator, 1929-52 Cars, Crosley Field

2nd Ted Babcock
"The Car of the Future" picture and other appliance ads

3rd John Terrey
Crosley Xervac Hair Growth Machine

THE STANDARD CATEGORIES (10 through 23)

Category 10: Passive Receivers

1st Bjorn Forsberg
Swedish Low Loss Crystal Receiver

2nd Dr. Gary W. Schieffer and George Weisberger
Marconi 106

2nd Jim Wilson
Briggs and Stratton crystal set

3rd Merrill Bancroft
Amrad 2575

Category 11: 1920s Amplifiers

1st Lane Upton
Federal 9 2-Stage Amp

Category 12: 1920s Tuned RF Receivers

1st Robert Lozier
Loewe 2H3n and OE-333 and speakers

2nd Ron Frisbie
Golden Leutz Super Pliodyne 9

Left: Jim Wilson and wife admire one of his two award plaques. (In addition to winning the blue ribbon in the Crosley "Advertising and Customer Documents" category, Jim carried away both the "Display" and "People's Choice" awards.) Right: Charles Stinger (center) receives Eunice Thompson "Best of Show" Award from Contest Coordinator Geoff Bourne. AWA President Bill Fizette looks on.

3rd Merrill Bancroft
Faraway, Cleartone

Category 13: 1920s Regenerative and Reflexed Receivers
1st Ernie Hite
Jones Symphony, 1923
2nd John Case
Eugene T. Turney 1-tube set, 1921
3rd Merrill Bancroft
Shepard Potter

Category 14. Cathedrals and Tombstones
1st John DeLoria
Crosley Model 1055

Category 15. Novelty Radios
1st John DeLoria
1938 Lumaradio Lamains Radio
2nd John Parsons
Delco Battery, World Globe, Cathedral

Category 16. Speakers
A. Horn
1st Merrill Bancroft
Coryphone Speaker
B. Cone
1st Jim Wilson
Air Chrome Speaker
2nd John Deloria
PAL Radio Co. Butterfly Speaker

Category 17. Test Equipment
1st Peter DeAngelo
Marconi Wavemeter and Galvanometer
2nd William Donzelli
Signal Corp Test Equipment

Category 18. Spark Transmitters and Artifacts
No Entries

Category 19. Vacuum Tube Transmitters
1st R W Schaumleffel
1934 5 Meter Vacuum Tube Transmitter (W8IYL)
2nd John V. Smith
Abbott TR-4
3rd Stan Hojnacki
1928 QST TGTP

Category 20. Restoration of Appearance
1st John DeLoria
Zenith 5S-127
2nd Fred Crews
American Cathedral

Category 21. Restoration of Operation
1st Fred Crews
22-inch Metrocone (Double Cone speaker)

Category 22. New or Rebuilt
1st Peter Yanczer
Mechanical TVs
2nd Bill Holly
Crystal Receiver

Category 23. Tubes
1st Bill Ross
TV Tube made from Glass Flask

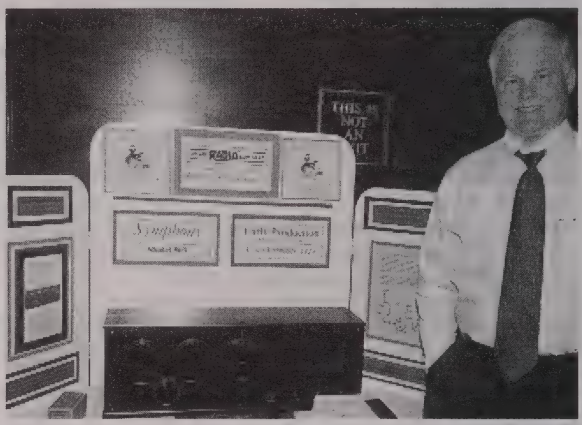
Major Contest Awards
Listed with AWA Recognition Awards

Contest Judges
Chris Bacon Ken Owens
Geoffrey Bourne Ralph Williams

Special Thanks To
Elinor Williams

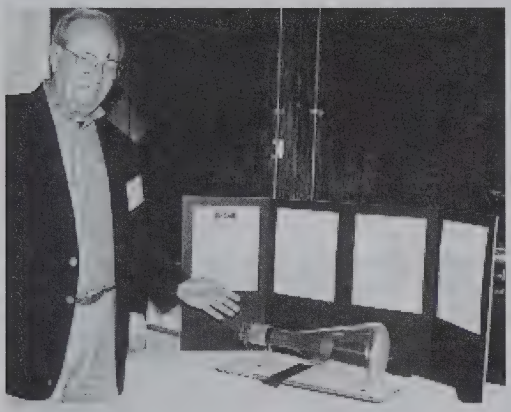
SELECTED CONTEST

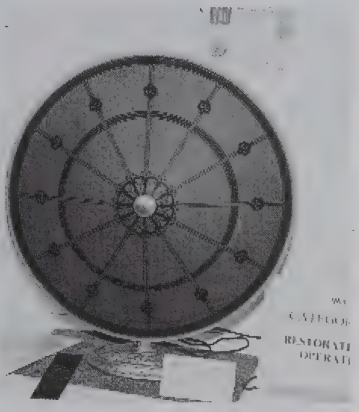
We wish we could show you all of the wonderful contest entries presented this year! Lack of room prevents it, but our conference cameraman has captured for you a nice selection of the 23 blue ribbon winners. Categories in which they were entered are given in parenthesis.

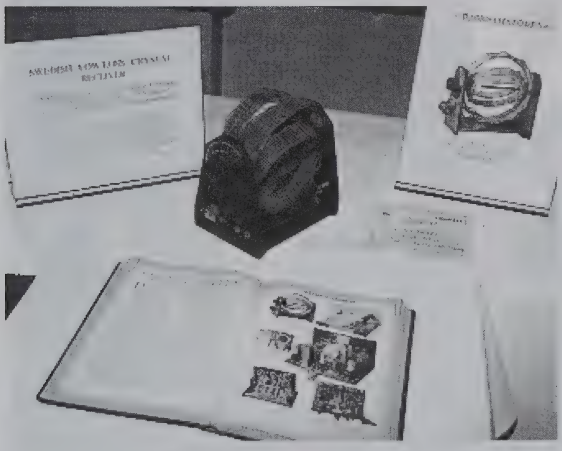


Clockwise, from top: Neatly-presented 1923 Jones Symphony display won the blue ribbon for a beaming Ernie Hite ("Regenerative and Reflexed Receivers"); "Grand Old Lady" display piece shown by Jim Wilson won "Display" and "People's Choice" awards in addition to a first in its category ("Advertising and Customer Documents"—Crosley); John DeLoria's restored Zenith 5S-127 ("Restoration of Apearance"); George Freeman's fascinating display of Crosley non-radio products ("Other Products"—Crosley).

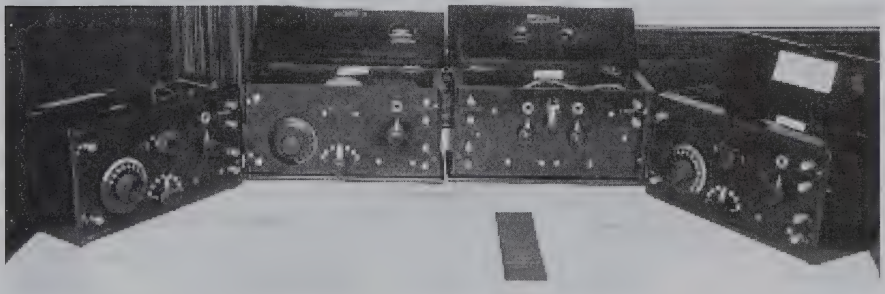
1ST PRIZE WINNERS







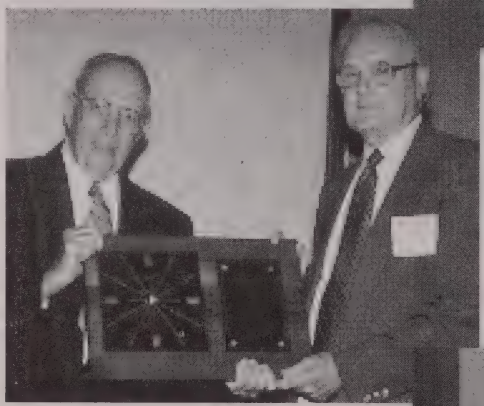
Clockwise, from top: Bill Ross with his winner: TV tube made from a glass flask as a classroom project ("Tubes"); Fred Crews' restored 22-inch Metrocone Double Cone speaker ("Restoration of Operation"); Ed Bell's array of Harko Senior Sets tied for first place ("The 1920s"—Crosley); Swedish Low Loss Crystal Receiver, as presented by Bjorn Forsberg ("Passive Receivers").



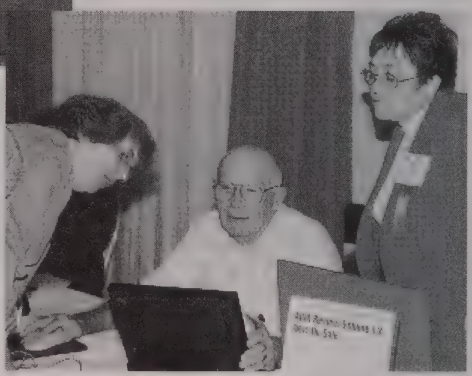
Annual Conference Candids

Bruce Roloson thanks Marriott staff member Diane Kolodziejski for her conference help with a slick little 40s Bakelite table model.

Liz Spivey takes a turn at staffing the always-busy Conference registration desk.

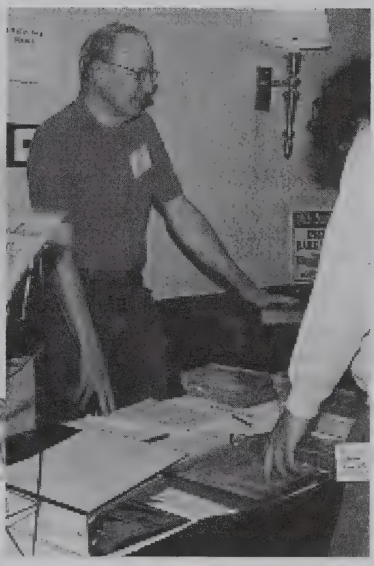


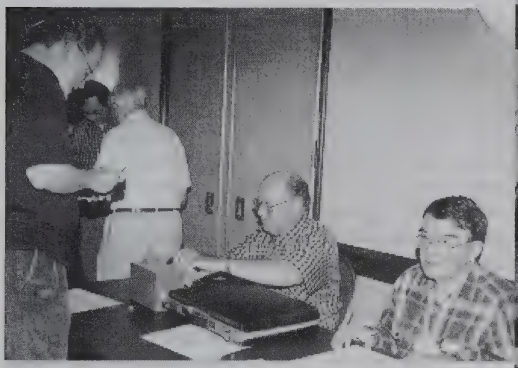
A pleased-looking Bill Fizette (left) hands the President's Award to Paul Bohlander, who accepted in behalf of Bill Denk.



Kathleen Davies (left) and Nancy Ransley get a demonstration of the new "OTB on CD" discs from Dale Goodwin.

As usual, Rainy Day Books proprietor Frank Dequart offered a fascinating selection of printed materials at the Conference Book Fair.

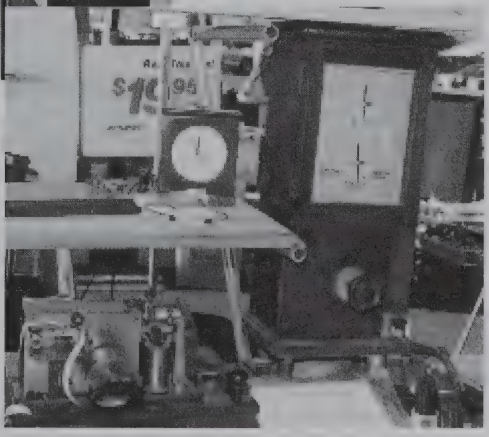




▲ *Barney Wooters (left) and Paul Mooney helped keep the finances straight at the Communications auction payout.*

"The Boogie Woogie Girls" of the Elmira, NY Little Theater recreated some of The Andrews Sisters' most nostalgic numbers at the Friday night banquet.

As in other years, Tom Perera's flea market display included a selection of treasures from his telegraph collection.



BY BILL FIZETTE, W2DGB

A Structured Approach to Fixing up Those Nice Old Radios

4 — More Test Gear...Identifying Components...More Study

Judging from the mail and verbal comments that have come my way since starting these articles last February, there is indeed a need for a beginner series. Our thanks to all who have taken the time to talk to me. This time we will consider some more test gear, a bit on components, and a quick review of some of the information resources that you will find helpful.

More Test Gear

Sooner or later you will be working on AC-DC radios that have one side of the chassis connected to the 115VAC power line. The user is protected by insulation, but the repair man definitely is not. This is potentially a very dangerous situation. In fact, if not approached properly, it can be lethal. To work on these sets there are two approaches.

The first way, and this is the recommended one, is to obtain or make an isolation transformer as described in the May article.

You will need a couple of 3 amp Radio Shack 12 or 14 volt transformers, a line cord, and an AC outlet. While it is best to mount everything in a box to protect against the line voltage, construction can be as simple as mounting the parts on a piece of board with some sort of plastic or hardware cloth cover. The two transformers are mounted back-to-back with their low-voltage windings wired together. Connect the line cord to one 115-volt winding and the outlet to the other.

The second way is to connect a household light bulb between the chassis and a ground connection such as the electrical system ground. If the bulb lights to full brilliance when the radio line cord is plugged in, your chassis is hot. Reverse the lead and it should go out or dim markedly. Any light at all means a leaky line bypass capacitor. In either case, DO NOT plug your radio in until you have done the basic maintenance that we will describe later.

Another very handy unit is a Variac, or other 115-volt line autotransformer. Ask your Elmer about it. I use mine to bring voltage up slowly on sets, to control the heat in my soldering iron, to provide a lower voltage for test purposes, and so forth. A calibrated signal source is a must for the bench. I have become used to the military surplus units as the LM or the BC-221, which often can be picked up a hamfests for low prices. The calibration is excellent. Be sure, however, to get one with the original calibration book, as identified by the serial number on both the book and the instrument label. Also, try to get one with modulation. If you don't have a power supply, they are not hard to make up. Your Elmer will show you how, or if we get the space later on we will print a diagram, or you can write me.

The other approach is to use the standard serviceman's signal generator. The only problem is that the calibration is often not too good, and the best solution for this is to purchase one of the Radio Shack or similar frequency counters.

A signal tracer is a handy gadget. If, for example, you have distortion in the audio output, you can listen to the signal back up the line and localize the distortion to the stage where it occurs. Again, not too expensive an item.

There are other instruments, such as an oscilloscope, which can be used to advantage. However, there is little point in getting involved with one unless you are prepared to spend the time learning how to use it. For now, stick with the basics that we have outlined.

Feedback on the Heath C3 Capacitor Checker

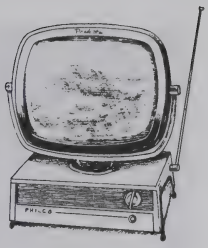
Member Van R. Field wishes to warn readers that the 50 volts used for the bridge circuit in the C3 does a good job of blowing out low-voltage

(continued on page 31)

AUTHOR'S ADDRESS: RR 1, BOX55, HENRYVILLE, PA 18332
e-mail w2dgb@enter.net

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



The Diminutive Echophone Model 41

As you are reading this, my wife, Susan, and I are unpaid volunteers, living on a 522 foot hospital ship anchored in Cotonou, the capitol of the West African country of Benin. I am the Head Electronics Technician on the ship, and Susan is the Crew Nurse. It is truly a great way to spend a few retirement years!—RB

Some years ago, I acquired an Echophone mechanical (spinning disc) TV which came from the collection of Ken McIntosh. This set is unusual in a number of ways:

(1) It is tiny by mechanical TV standards, smaller even than most table radios of the early 30s.

(2) The set is self contained; it does not require an external scanning unit but has the receiver in the same cabinet with the scanning assembly and viewing screen.

(3) A "crater" tube is used to produce the light for the image. This means that the image is much brighter than the standard flat plate neon tube used in most mechanical TVs.

(4) The scanning disc is a lens type rather than the more common "pinhole" design; it has 3 spirals of 15 lenses each instead of a single spiral of perhaps 30, 45, or 60 holes.

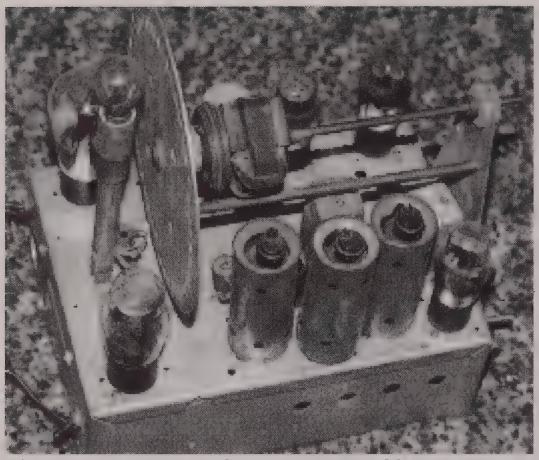
(5) The set has a ground glass imaging port rather than a lens system. This provides an image easily viewed by several persons at some distance away.

The original sales brochure brags that...

Echophone Television Model 41 is the first practical television set for the home, priced within the limits of all pocket books. The features described in detail, to the right, indicate the perfection which Echophone has attained in creating this HOME television set. Featuring this model 41 is the cabinet of modern lines, constructed of the finest walnut woods for durability and finish. It is only 17" high, 10" wide, and 12" deep, for Echophone at last has obsoleted the cumbersome television chassis, and produced this efficient compact model which requires so little space in the home.

The receiver has a tuning range of from 1500 to 3000 kHz (typically the TV band in those days) and is a TRF design utilizing type 58 tetrodes—the latest technology that 1932 had to offer. The detector is a type 27 followed by two more 27s and a 45 in a resistance coupled cir-

Illustration from Echophone advertising brochure shows the diminutive Model 41 almost dwarfed by a table lamp.



Electronic circuitry and scanning assembly are on same chassis, contributing to the Model 41's compact size.

cuit. A claimed bandwidth of 40 kHz is maintained to provide adequate response for the crater neon. The rectifier is a type 80.

Located near the rear of the chassis is a 50 Hz synchronous motor driving an 8" diameter disc, with its three spirals of 15 lenses each, at 900 rpm. Mounted directly behind and near the top edge of the disc is a small crater-type neon tube. The resulting image is projected on a ground glass about 4" square. A framing control allows the motor assembly to be rotated to enable the receiver disc to be brought into phase with the transmitter disc. (Incidently, the triple interlace system was patented in 1929 by Ulises Sanabria. See reference 6.)

The Echophone brochure goes on to say...

With the Echophone Television Model 41 you need no longer wonder 'what they look like.' See every performer, artist, comedian, soloist—as they sing, play, or dance. Exceptionally brilliant, clear and steady image, with all the shadows so desirable in good photography are obtainable in this new, sensational television receiver.

Synchronization of the receiver disc to the camera disc was provided for by operating the receiver on the same power grid as that of the transmitter. This was the case for as many as 243 towns and cities tied to the Iowa City power grid. Thus when viewers started up their scanners, theoretically all they had to do was to adjust the framing knob on the front of the set to bring the 45 line, triple interlaced image into proper phase.

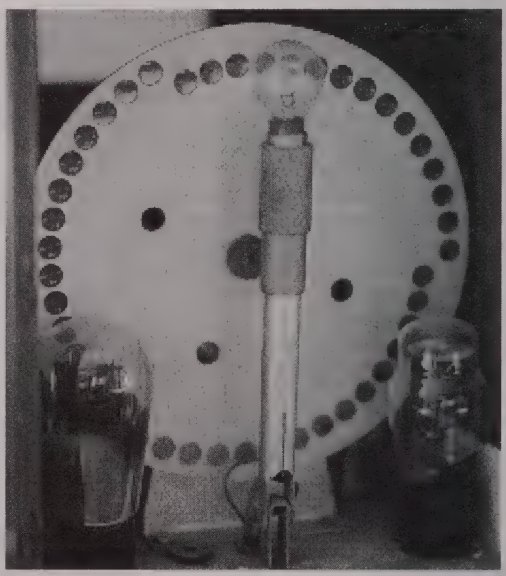
Again, from the brochure...

There is no fuss or bother! Operation is simplicity itself! Just turn the dial to the desired station and the image appears on the special ground screen. Simple knobs are used to frame the picture, to control the sensitivity of the picture, and to tune in the station. Installation of the set consists simply of plugging into the house current.

The image on the Echophone was produced by a crater neon tube, developed by D. MacFarland Moore. The crater tube generated a point source of red light rather than the flat plate glow typical of most mechanical sets. (Only a tiny portion of the illuminated plate was visible to the viewer as each of the holes of the spiral passed over the plate.) A lens disc was necessary to focus the point source on the translucent screen.

The brochure boldly states...

Miss nothing! See and hear the programs



Rear view of the Model 41 provides a good look at the "crater tube" and the scanning disk with its three 15-lens spirals.

broadcast from all parts of the world. In the comfort of your own home, it is possible for you to tread the highways and byways of the world with your Echophone television. Model 41 is sensitive and selective to an unbelievable degree. Enjoy everything on the air.

The Model 41 was manufactured by the Echophone Radio Manufacturing Company, Ltd, which was a wholly owned subsidiary of the Western Television Corporation of Chicago. Western was financed by Clement Wade, a millionaire who made his fortune in Eskimo Pies! Wade, it turns out, was an alumnus of the State University of Iowa—and therein lies the rest of the story, which will follow in a subsequent issue.

REFERENCES:

1. Echophone Television Model 41 advertising brochure.
2. Instruction book: *Installation and Operation of Empire State and Model 41 Television Receivers.*
3 *Radio Craft*, August 1935.
4. Dr. E. B. Kurtz, *Pioneering in Educational Television: 1932-1939.*"
5. Udelson, *The Great Television Race.*
6. *The OTB*, November 1997, "Ulises A. Sanabria— Mechanical Television Pioneer" by James T. Hawes.

A STRUCTURED APPROACH, *continued from page 28*

electrolytics, such as used in transistor radios. If you have questions, use your VTVM to find out what you are working with.

Identifying Components

In lesson 1 we discussed the need for reference sources, and some examples were listed. You will have to assume that, sooner or later, you will run across some strange part that does not resemble the usual capacitor or resistor. Also, some components will resemble something that they are not. Examples: A molded unit that resembles a capacitor, but is actually a wire resistor; an item that looks like a resistor, but is actually a small capacitor; a piece of spaghetti with wires coming out the end, which hides a wirewound resistor; a sealed can with numerous wires exiting to all parts of the chassis, but which probably contains an assortment of capacitors and chokes. What to do?

If you have the correct wiring diagram, it is usually easy to locate the unknown item. Thus the absolute need to have information sources, especially if you find any symptoms of changes by previous owners.

Your job is to make corrections and replace aged components, and perform necessary cosmetic repairs. Electrically, for the most part you will be dealing with inductances, capacitors, or resistors, or some combination thereof, along with vacuum tubes. But aside from that, if you find out that you have a bad specialized component as an IF transformer, then what? You can't go down to Radio Shack and just buy one.

The answer is that you will need to repair the component, and to avoid reinventing the wheel, it is very nice to be able to access the work of someone who has been there and solved the problem. Back issues of this Journal are now available on CDs (see announcement elsewhere in this issue), and contain a wealth of useful information. Also, *Antique Radio Classified* magazine often runs articles on component repair.

More Study

If you are indeed a beginner, repairing old radios is like any other discipline. You need to know what you are doing, and the only way to find out is to read, study, and do the work. One good reference source, aside from the ones mentioned previously, is to locate an *ARRL Handbook* (A yearly publication of The Amateur Radio Relay League) from the mid 1930s up to 1950, the era in which most of the radios you will be working on are from. The basic circuits are explained and illustrated.

Next Time

In the next installment I will discuss the repair sequence for a simple "old radio." Yes, we are finally getting to actually fixing one. In the meantime, however, if you wish to get a head start, the Communication Receiver column in this issue describes the start of a restoration/repair project of a 1936 radio. Also please feel free to send me your questions and comments for discussion in future columns.

BY PETE SYPHER, KC4SI

EXPLOSIVE CHARGES FELL NSS ANTENNA FARM

In November, 1998, The OTB *ran an article by Peter Sypher describing a tour he had taken through the shut-down naval transmitting facility (NSS) at Annapolis, MD. At that time, the future of the installation was gloomy; dismantling of the transmitter having already begun. In a Letter to the Editor (May, 1999* OTB*), Peter reported on the efforts of a local citizen's group to save three of the antenna towers and perhaps preserve some of the transmitter building as a museum. In the following report, Peter brings up to date on the situation as of last April.—MFE*

As reported in the May 1999 *OTB* ("Letters to the Editor"), an Annapolis-area citizens' group recommended saving from demolition three towers from the former Naval Radio Transmitting Facility NSS. This acility is located adjacent the U.S. Naval Academy.

The citizen's group (the Severn River Association) made the recommendation to Maryland's representatives in Congress in early 1999. The three towers thus given a reprieve from toppling are the southernmost towers on Greenbury Point, and are referred to as the "Eiffel" towers because of their resemblance to that famous structure. They differ from the tower in Paris in that they are 600 feet tall and are three-legged. These towers were erected in 1934, not in 1918 as stated in my May, 1998 letter.

A total of 19 towers originally supported two nearby, but independent, VLF antennas as well as three conical monopole antennas that were demolished in the fall of 1999. The major antenna, called the Modified Goliath, was comprised of one 1200-foot insulated guyed tower, six guyed 600-foot towers, and the three unguyed 600-foot Eiffel towers, which supported the southern end of the top hat.

It is this antenna that was fed by the megawatt AN/FRT-78 transmitter in Building 5. A 66-foot feedline support tower close to Building 5 was the eleventh tower associated with the main VLF system.

Located about one-half mile west of the modified Goliath antenna was the Marconi Triadic antenna, also a VLF system but of higher frequency and lower power than the main system. Three 300-foot towers supported this. Other towers in the area, all operating under the call letters NSS, were an 800-foot insulated guyed tower operated as a monopole antenna, the three 75-foot conical monopole antennas, and another 300-foot tower.

The 1200-footer and six 600-footer NSS antennas (not all visible in photo) come down almost simultaneously with the help of hundreds of explosive charges.

The demolition of the sixteen towers began with the non-explosive toppling of the three 75-footers, followed by the use of RDX, on 13 November 1999, to topple the three 300-foot towers near Building 60. According to the Annapolis *Capital*, 16 pounds of RDX were used to blow out one leg of each of the

AUTHOR'S ADDRESS: 9180 DAMASCUS RD., DAMASCUS, MD 20872-1223

three towers. The demolition contractor, Controlled Demolition Incorporated of Phoenix, Maryland, placed a total of 67 charges of RDX on the towers that morning to bring them down.

The toppling of the 800-foot guyed monopole antenna followed on 20 November. Setting off the RDX charges placed on the tower and guy anchors was delayed several hours by fog. Finally, just before sundown, the fog lifted enough that the entire tower could be observed and the explosives were fired.

The finale occurred at 4:15 on the afternoon of Thursday, 9 December 1999. Through the use of hundreds of precisely timed explosive charges, the 1200-footer and the six guyed 600-foot towers came down all at once. The remaining 300-foot tower was also toppled that day. The top hat portion of the antenna, made of thousands of feet of cladded cable having diameters of 0.80 to 1.64 inches, came down with the towers. (The top hat panels connected to the Eiffel towers had been lowered without the use of explosives prior to 9 December.)

The core of the cladded cables making up the four panels of the top hat was steel. The cladding of the oldest panel, the one supported by the Eiffel towers, was bronze. The cladding of the newer (1971) panels was aluminum. The weight of what was brought down this day is said to be about equal to that of a naval destroyer.

The demolition was done by a sequence of detonations (most of them RDX) covering a span of 10 seconds. The first "wave" of explosions severed the antenna halyards of three 600-foot towers. The panels of the top hat that had not been previously lowered began falling toward the 1200-foot tower. Then, the guy cables of the six 600-footers that were between each tower and the 1200-footer were blown. At the same time, the guy cables of the 1200-footers were severed by RDX charges. After this, charges placed at the 900-foot level, the 600-foot level and the 300-foot level were set off, in that order.

This sequence of blasts made the 1200-foot tower collapse in a zigzag pattern, like a carpenter's rule. Finally, the outboard guy cables were blown. All the towers fell very close to their predicted resting places. Part of the main tower penetrated the earth for 25 to 30 feet.

John Schorpp, the sole remaining employee of the Naval Radio Transmitting Facility, Mark Loizeaux, President of Controlled Demolition, Inc. and Bob Prince, an engineer with the Naval Facilities Engineering Services Center supplied me with details of the demolition. The future of the three Eiffel towers is not yet assured. The reprieve of these towers from demolition last fall was on the condition that someone would take over responsibility from the Navy no later than November 2000.

There are tentative plans for the State of Maryland to assume responsibility. The state, in turn, will probably let a management contract that will cover maintenance of the obstruction lighting, the painting and other maintenance of the steelwork, and the radio spectrum coordination of the repeaters and other radio equipment expected to be mounted on the towers. It is hoped that rental fees paid by the tower users will make the towers financially self supporting. We hope one tower will be left as it is now, to be the "historical" tower, another will have military and public safety (police and fire department) repeaters, and the third will have commercial and amateur radio users. If these plans fall through, and no one steps forward to take over these towers by late 2000, the Navy will demolish them. A more likely outcome is that one tower will survive and all the repeaters will be mounted on that one.

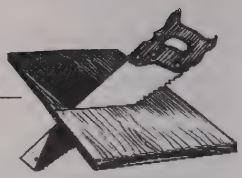
I am among a dozen or so who are monitoring the progress of the handover of the towers to Maryland; we will do what we can to preserve them. The fate of what remains of the AN/FRT-78 transmitter is also in doubt. This transmitter was built in two 500-kW halves and fed the antenna with 1000 kW when both halves were active. One half is still intact; the other half has been dismantled. We're hoping the Navy will fund the conversion of Building 5 into a command and control museum featuring VLF radio technology.

The twelve or so of us are trying to drum up support for both this and the tower preservation effort. Each half of the transmitter is 20 feet wide by 60 feet deep, which makes relocating to an existing museum out of the question. The two Maryland senators seem to like the idea of preserving the towers and having a radio museum. They aren't committed, however, to Navy funding, as evidenced by Senator Mikulski in a recent letter to me in which she suggested that we also seek funding at the state level.

The Navy would do well to have this museum educating the public about the scope of the Navy's impact on technology in the twentieth century. Similar public relations considerations motivated the National Security Agency to open the National Cryptologic Museum in Laurel, Maryland. This museum, of a quality equaling or exceeding that of the Smithsonian museums, educates the public in the areas of encryption, decryption, and radio intercepts, both past and present.

BREADBOARDING

EDITED BY **RICHARD A. PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124
PLEASE INCLUDE SASE FOR REPLY.



Bring Historical Circuits to Life On Your Workbench!

Neutralizing—How Does it Work?

Last time we looked at how the radio industry got around the triode gain-bandwidth problem by inventing the screen grid. But before that, Professor Hazeltine invented a simple way to overcome the effect of grid-plate capacitance by what he called "neutralizing." For a few years during the 'twenties, you could make or buy "Neutrodons," Neutroformers," or "Neutrowound" components and hardware to keep up with your radio-addicted neighbors. Let's build a breadboarded neutralized triode amplifier and see what happens and how well it works.

Remember from the last column: in a triode, the small capacitance between grid and plate limits its ability to amplify signals in high-gain circuits because the plate signal, out of phase with the grid signal, feeds back to the grid to a small extent, and reduces the effective gain somewhat by cancellation. Moreover, at some critical high frequency the feedback may be great enough to cause unwanted oscillations.

Hazeltine realized that if he could create a small signal out-of-phase with the plate waveform and connect the smaller signal back to the grid, then the unwanted feedback would itself be effectively cancelled. Working at RF, he added a winding to the plate circuit transformer and connected its hot side through an adjustable capacitor back to the tube's grid. I bet the first time he did this, the tube oscillated unmercifully. Got to have that feedback signal out of phase!

Here's a neutralized triode circuit (Figure 1): when you look at the circuit long enough, you'll realize the current through the grid-plate capacitance, shown in dotted lines, can balance the current through the small neutralizing cap if the feedback winding is hooked up in the proper polarity and if the setting of the cap is just right.

I got hold of a cute little book from "The Radio Amateur's Library" (1) all about Neutrodyne circuits. The "secrets" of winding the special transformers are shown clearly, and I set about making one for a breadboard.

I scrounged an RF coil from a junked car radio and removed all the windings, saving four solder lugs at one end. I wound the form full of No. 30 enamel wire, with a tap at about 25%. Over the top of this I wrapped a piece of insulating paper and laid another winding of about 20% the length of the coil form. Not quite the three-inch diameter items the little book calls for, but when I checked my coil for its tuning range, I found it covered the broadcast band nicely.

Figure 2 shows my coil mounted on a piece of oak in the true tradition. I used banana posts for connections and a generic four-pin tube socket mounted on a piece of copperclad for a ground plane. The coil is the plate transformer, and its primary is the outside winding. The secondary tap, 25% up from the ground end, is the pickoff point for the neutralizing signal, which will be out of phase from the plate signal if the primary is connected right.

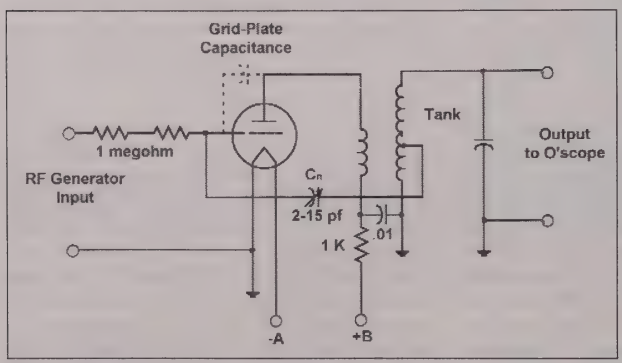


Fig. 1. My neutralized triode test circuit.

I used fixed capacitors for tuning the secondary tank at the frequencies I chose for testing: 800 kHz and 1600 kHz. The one-meg resistors isolate the grid from the RF generator. I used a '26 triode, having a grid-to-plate capacitance of 8.1 pF., according to my tube manual.

Come on—this is as simple as a breadboard gets. Go ahead and put one of these together. The procedure for adjusting the neutralizing cap goes like this: you plug

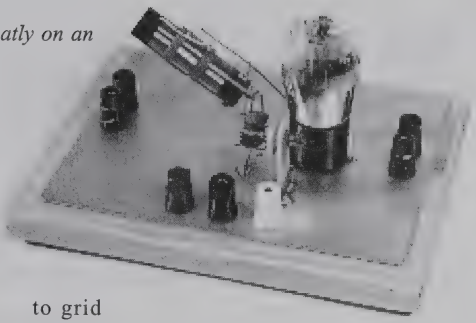


Fig.2. Neutralization test circuit is mounted neatly on an oak block. Tube is a type 26.

the tube in and, without power, adjust the RF generator for maximum signal across the output tank. Then tweak the neutralizing capacitor to null out the tank signal. If you hooked up the primary coil right, the null will be there.

I needed 10 or 15 volts from the generator to be able to observe a voltage at null of about 10 millivolts. With the type 26 tube in the socket, my little capacitor needed to be set to about 5 uuF. Now you can start measuring how well the circuit works as an amplifier. Turn power on and measure the tank voltage both with and without the neutralizing capacitor connected.

I was pleasantly surprised to find a pretty big difference in gain with and without the neutralizing capacitor connected in my circuit. Here's what I got:

Tube conditions: Type 26; Filament 1.5 volts, B+ = 90 volts, grid signal 100 mV.

Frequency	Gain without neutralizing	Gain, neutralized
800 kHz	8	10
1600 kHz	9.5	16

For three tubes in cascade, the net result of neutralizing might thus be (16 × 16 × 16), or 4096, rather than maybe 1000 overall without this compensation. That's a good return for a small expenditure. If you build a breadboard like this, try some other tubes. But remember—the smaller the tube, the less improvement neutralizing will offer.

Neutralized triodes continue in use in transmitters—it's critical if you want to squeeze maximum power out of a pair of 304TLs the way my old pal, Connie, at W1DQA, used to do.

Now take a look at Figure 3: it's the tube deck from an old neutrodyne-type receiver with little compensating capacitors made from glass tubing and coiled wire. The caps connect from plate to grid at each tube, and you were supposed to adjust one whenever you had to change a tube. The neutralizing capacitors must have been fixed, so the little adjustable caps you see allowed for differences in tube parameters.

You say you don't have an RF generator? Next time in this column we'll see how we can make a simple one out of easy-to-get parts.

Errata

The schematics of my regenerative detectors have all shown pretty large values for the grid coupling capacitors at the detector grid leaks. I actually used 200 pF values rather than the .002 uF items indicated. Thanks to several sharp-eyed readers who finally pointed this out to me. For operation at frequencies above the BC band, this capacitor can even be as low as 50 pF.

Also, for the screen-grid receiver in the last issue, the regeneration control should be wired differently: connect one end to ground and connect the wiper to the screen and its bypass cap. This allows the screen voltage to be varied up to about half the value of B+. My mistake!

REFERENCE

(1) Webb, F.F., *How to Make a Neutrodyne Receiver*, The Radio Library Co. New York, 1924; Reprinted by Lindsay Publications Inc. Bradley, IL 60915; 1997

Fig. 3. Tube deck from an old Neutrodyne receiver (see text).

BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239
PLEASE INCLUDE SASE FOR REPLY.

The Cape Breton Stations Of the Marconi Transatlantic Radio Service—Part 2

(Part 1 of this article appeared in the August, 2000 issue.)

By Henry Bradford

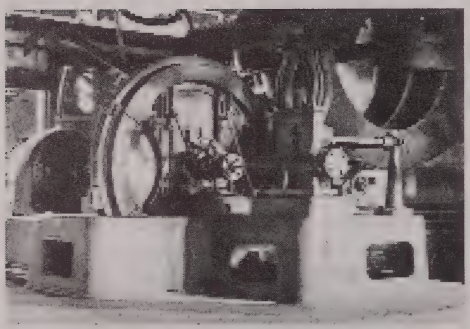


Fig. 6. The 5-foot diameter rotary spark discharger at Marconi Towers, circa 1910. Photo courtesy of the Canadian Marconi Company, Ltd.

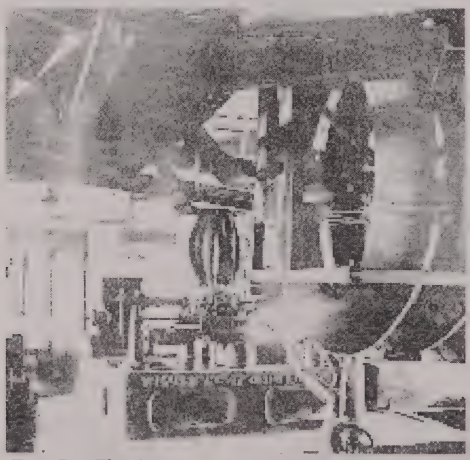


Fig. 7a. The 3-turn primary of the output transformer at Marconi Towers. Photo courtesy of the Miner's Museum, Glace Bay, NS, Canada.

The RF Circuits

A rotary-gap type of spark discharger was used (Figure 6). A large steel wheel, roughly five feet in diameter, had regularly spaced copper studs on both sides of the rim near its circumference. As a pair of studs passed between two horizontal disc-shaped copper electrodes, the gaps narrowed. This caused the capacitor to discharge through the studs in a short, powerful electric spark.

The spark current pulse passing through the primary coil of the output transformer (Figure 7a) excited a damped train of RF oscillations in the secondary coil and aerial circuit. The frequency of these oscillations was the resonant frequency of the secondary circuit, which consisted of the antenna capacitance and the inductance of the secondary coil. A pair of coils was connected in series with the power supply to isolate the capacitor and primary coil from the power supply when the spark gap discharged. The RF oscillations damped out slowly as radiation and resistance losses in the antenna circuit dissipated the RF energy.

The concept of using the electrical impulse generated by the spark discharge of a capacitor to excite high frequency oscillations in a resonant circuit had been Hertz's answer to the problem of generating a RF signal when no other technology existed. The signal characteristic of tuned spark transmitters was called "damped wave," as opposed to continuous wave, which was still in its early years of development (i.e. Poulsen Arc, and Goldschmidt and Alexanderson high frequency alternators).

The rapidly rotating wheel of the spark discharger caused a periodic extinguishing of the

AUTHOR'S ADDRESS: SITE 1, COMP A0, RR2, WOLFVILLE, NS B0P1X0 CANADA
E-MAIL: HENRY.BRADFORD@NS.SYMPATICO.CA

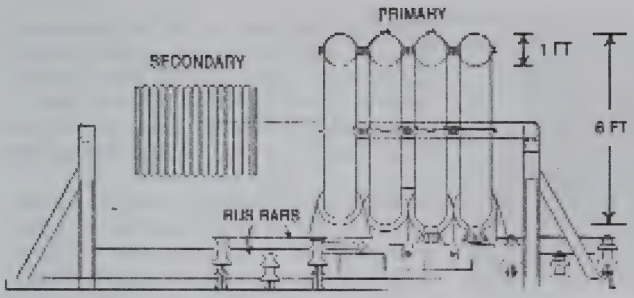


Fig. 7b. Side view of an output transformer similar to the one at Marconi Towers, adapted from Figure 316 of Reference 3. This unit was located at a transpacific station at Kahuku, Hawaiian Islands.

spark when the rotating studs moved out of the stationary electrodes. A stream of compressed air from a nozzle cooled the area around the spark, and aided in quenching (extinguishing) the spark. The periodic "make-break" of the spark was a few hundred per second. This generated a regularly-pulsed damped carrier wave, giving the Morse code signal a musical pitch in the receiving operator's headphones.

The output transformer had three primary turns about six feet in diameter. Each turn consisted of many wires in parallel wrapped on the outside surface of a toroidal shaped coil form with a cross sectional diameter of one foot (Figure 7a, b). The ten- turn secondary coil had a smaller diameter, and could be moved axially within the primary coil to vary its coupling with the primary.

The transmitter was rated at a respectable 80 kilowatts delivered to the antenna (not necessarily radiated power). This was about one-half of the average DC power from the generators.

The Antenna System

The antenna initially was an umbrella of wires about 2000 feet in diameter, supported about 200 feet above the ground by four central wooden towers and circles of tall wooden masts (Figure 8). After much experimentation, this evolved into an inverted-L form with an array of connected parallel horizontal wires stretching westward, away from the overseas receiving station. This orientation, which during the time had various questionable explanations, was found to work best.

The vertical structure of the antenna was the principal radiator, while the larger horizontal structure mainly provided top loading capacitance. The antenna, together with its electrical image in the ground screen, could be regarded as essentially a vertical dipole, very short compared to the wavelength, with a non-symmetrical capacitive top-hat end loading. The very low radiation resistance of both umbrella and inverted-L antennas made it them very inefficient radiators.

In 1913 the transmitting frequency was 37.5 kHz (8000 meters). This was much lower than that of the first Glace Bay station, and was much better defined by "sharper tuning" of the radiated energy. In this frequency range, communications were found to be steady when it was daylight at both Glace Bay and Clifden, Ireland, very variable when it was night at both stations, and variable in a fairly predictable way when the sun rose or set at either station. The ionosphere's influence and the effects of the solar cycle of activity had yet to be appreciated.

The Easly 1920s Marconi Towers Transmitter

The Glace Bay transmitter was converted to vacuum tube operation around 1920, when high-powered transmitter triodes became available. The original low frequency transatlantic link be-

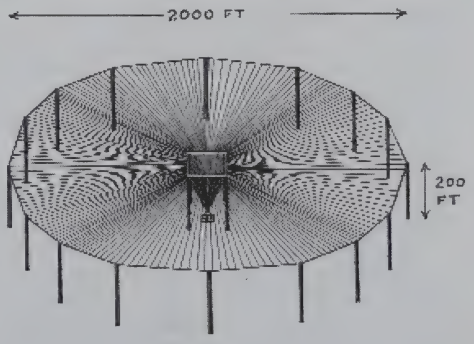


Fig. 8. A schematic representation of the first transmitting antenna at Marconi Towers, circa 1905, adapted from Figure 12.1 of Reference 2.

Fig. 9. Marconi's home during the 1905-1907 "Marconi Towers" construction period. It is now the home of Douglas and Diane Cunningham and family. Photo by the author.

Fig. 10. The remains of the transmitter building at Marconi Towers. Photo by the author.

tween Marconi Towers and Ireland was replaced by a short-wave link between London, England and Montreal, Quebec in 1926. The new short-wave link initially used a wavelength of about 16 meters (roughly 19 MHz) during daytime and about 32 meters (roughly 9.4 MHz) during nighttime.

After 1926, the Marconi Towers site operated below 535 kHz as a long-range ship-shore station. The station was closed in 1945. The house that Marconi and his wife lived in while he got the station on the air (Figure 9) and the remains of the transmitter building (Figure 10) still stand at the Marconi Towers site.

References

1. R.N. Vyvyan, *Wireless Over Thirty Years*, George Routledge & Sons, 1933. Reprinted as *Marconi And Wireless*, EP Publishing Limited, 1974.
2. W.J. Baker, *A History Of The Marconi Company*, Methuen & Co. Ltd., 1970.
3. Elmer E. Bucher, *Practical Wireless Telegraphy, Part XVI*, Wireless Press, Inc., 1921.

Silent Keys

We record the passing of the following AWA members with deep regret.

ROBERT M. BREWER, (6-22-00) **ROSS A. SMITH, 82, (7-24-00)**

WALTER P. CLELAND, K5WYG **FREDERICK G. SUFFIELD, (4-6-00)**

CHARLES A. YOUNG, W2NMX (7-9-00)

ROSS A. SMITH

An electrical engineer and radio historian, Ross worked for CTS Corporation for 43 years. He retired in 1983 as Quality Control Manager and Director of the Testing Laboratory. Later, he served as Curator of the CTS Corporate Museum. His "The CTS Story" appeared in *The OTB* Volume 39-1 (February, 1998).

Smith was a long-time member of AWA. He received many awards for his entries in the Old Equipment Contests and contributed numerous articles to *The OTB*. He was an active member of the Indiana Historical Radio Society, which he helped organize on October 4, 1971.

Gifts in Ross's memory may be given to Saint Paul's United Methodist Church, 405 W. Beardsley Ave., Elkhart, IN 46516. The Society has also created a Ross Smith Best of Show Award for their old equipment contests and established a Ross Smith Memorial to perpetuate and honor his memory. For details on how to contribute, contact Mr. Fred Schultz, Curator, IHRS Historic Radio Museum, at P.O. Box 353, 800 Lincolnway South, Ligonier, IN 46767.

BY LUDWELL SIBLEY

TUBE LORE: "MAKE VS. BUY" AT RCA

Part 2 (Conclusion)

It is also profitable to look at specific families of tubes. Here are the major ones.

Loktal types. All RCA loktal types were purchased. A line of 55 types was added to the RCA renewal line in 1947, bought (initially, at least) from Sylvania. Others were added later.

Eye Tubes. RCA, of course, was the original source of electron-ray indicators; indeed, the term "magic eye" was an RCA Victor sales phrase. Yet even in the '30s heyday of the eye tube, RCA's 2E5s were purchased. The RCA product line deemphasized eyes after WW II, leaving mainly the basic 6E5. All the postwar eyes were bought: 1M3, 6AL7GT, 6DA5/EM81, 6FG6/EM84, and 6HU6/EM87.

Miniatures. Here is a bit of lore from the archive: for late-vintage production, at least, a tiny triangle molded into the middle of the base indicates an RCA-made tube.

"Novar" and "Magnoval" Types. RCA had introduced the "Novar" base for power tubes and certain TV types like dampers. All Novar types that it sold were apparently made in-house. The "Magnoval" base was a foreign innovation from the Philips companies, duplicating most of the features of the "Novar." All Magnoval types sold by RCA were purchased—for example, 6GB5, 6KG6/EL505, and 27GB5/PL500.

Compactrons. GE originated this novel style. RCA followed its usual mixed philosophy: it made a few (6AV11) and bought some (11AR11, 11BT11, 24JZ8). Others were bought-then-made (6AL11, 6BF11, 13J10).

"Lighthouse" Types. The lighthouse disc-seal triode was a GE development, but RCA had a role during WW II in improving the design by such measures as replacing soldered-up anodes with single-piece versions. RCA abandoned manufacture of these types early after WW II, in favor of its new line of "pencil" triodes. Thus 2C40s and 2C43s were bought from GE as of 1947, while 2C39As came from Machlett.

Acorns, Nuvistors, and "Pencil" Triodes. These were "flagship" innovations by RCA in their time, and were always made in-house. However, RCA was not the industry's sole source: Sonotone made acorns during WW II, and components for the 5675, 5794, and 5876 pencil tubes were offered to other makers via RCA's parts catalog.

"Special Red" Types. This line (5690-5693) was another RCA development, and stayed RCA-made.

"9T9" Types. Sylvania was the original source of this style. It combined a T9 bulb (9/8 of an inch in diameter) with the nine-pin base normally used on miniature types. RCA purchased some of these (6GM5, 6HZ8, 6KU8, 15EW7, 7695), made others (6EW7, 6FD7, 10EW7), and bought-then-made a couple (6GC5, 13FD7). The 6JT8 and 10JT8 were simultaneously made and bought.

10-Pin Miniatures. Sylvania put an extra pin in the center of a nine-pin base to produce this low-runner style. RCA purchased its 6C9s, 6J9s, 17C9s, and 19Q9s.

Metal Types. RCA had put the GE-developed metal tube into original production. Even so, as demand for certain types slackened, they were bought from GE. These were the 5W4 (during 1942-52) and 6N7. Several glass-bulbed counterparts of metal types were purchased: 6A8GT, 6K8G, 6R7GT, 6SF5GT, 6SJ7GT, 6SR7GT, 12SJ7GT, etc.

Magnetrons. RCA had a sizable role in radar manufacture during WW II, but mainly on VHF radars. The company thus largely missed out on early development of microwave tubes—as opposed to, say, Raytheon, which had its product line revolutionized. RCA's main in-house magnetron at the time was the 2J41. RCA later made the 6865 and as mentioned below, the 725A.

102 MCDONOUGH RD., GOLD HILL, OR 97525-9626

RCA 7008s were first made, then purchased.

Klystrons. The company had only a modest position in klystron manufacture. RCA sold 2K26s and 2K56s made by Western Electric for use in microwave radio-relay systems made by RCA Victor. These were used in TV remote pickups and in the Western Union Telegraph Company intercity network. (When WE stopped selling to the general market, Raytheon replaced them as the source of 2K26s.) This may have been a missed opportunity: as of 1948, RCA claimed to be the only vendor licensed under patents of the Sperry Gyroscope Co. to sell klystrons for civilian use. RCA developed and made a few later transmitting klystrons— the 4658, 8811, 8568, and 8840—but these were mainly specials for linear accelerators and the like.

Subminiature Types. RCA lacked the strong position in subminiature tubes held by Sylvania and Raytheon. Sylvania, in particular, had benefitted from Government development funding during WW II, and emerged with a head start. Nevertheless, RCA introduced its own line of subminiature types in 1949, in hope of their being used in an RCA Victor "personal" radio that apparently didn't materialize. RCA also made a line of "premium" military subminiatures of types sold by Tung-Sol, GE, and the others—such types as the 5636, 5639, 5840, and 5902. A few (5642, 5783, 6021, etc.) had been purchased all along. Some of these (5718, 5719, 5899) were converted to "purchased" as early as 1960. RCA abandoned manufacture of subminiature tubes between 1959 and 1966; all types in the line became "purchased."

The "ARINC" Types. Development of these early high-reliability miniatures, familiar to today's military-equipment collector, was funded by Aeronautical Radio, Inc. and carried out mainly by GE. RCA was not a major player on these until they appeared on the Armed Forces "preferred" list. As a result, RCA made the 5654, 5726, 5727, 5749, 5751, 5814, and 6201; purchased the 5686 and 5750; and purchased-then-made the 5670 and 5725.

100-mA AC-DC Types. This line (18FW6, 18FX6, 18FY6, 32ET5, 36AM3) was introduced by Sylvania, and initially purchased by RCA as of 1959. These types were expected to supersede the "miniature All-American Five" types. The Victor division began making radios with these types, which were converted to in-house production the next year. Despite expectations, they flopped; many radio restorers have never heard of them.

Industrial Types. RCA decided, in 1946, to broaden its product line into the industrial market by adding popular ignitrons, thyratrons, and other special-purpose types. Indeed, RCA's program led to official registration, in the "5500" series, of several types previously known only by others' proprietary numbers like "FG-415" or "WL-681." The 5550 through 5555 ignitrons were bought, initially in equal numbers from GE and Westinghouse. The later 5822 ignitron came from GE. Thyratrons and others in the 5557-5561 line were GE-made, as was the 502A. RCA also marketed Westinghouse-made thyratrons like the 629, 676, 677, and 678.

Audio Types. RCA followed the same philosophy of making vs. buying with hi-fi tubes as with the others. "Purchased" types included 5AR4/GZ34, 6CA7, 6GW8/ECL86, 5881, 6550, 7355, 7581, 7591,7695, and 8417. Certain types were RCA developments from the start, and stayed in-house: 5879, 6973, 7025, 7027, 7868, 6EU7, and 6L6GC. Other manufactured types included 6CA4 and 6BQ5. RCA-made 6BQ5s apparently met the registration specs for the 7189; unmarked 6BQ5s were etched "7189" and life-tested at higher voltage. RCA 7408s were first purchased, then made by taking them from 6V6GTA production.

"Western Electric" Types. RCA made 725A magnetrons for a time, ca. 1950, for use in RCA Radiomarine radars. The accompanying 715C pulser tubes were also RCA-made. The company bought its 407As, 408As, 5591s (403Bs), 5842s (417As), and 5847s (404As), with GE or Sylvania as the likely sources.

Large Transmitting Types. Although a major maker of transmitting tubes, RCA did resell a few transmitting tubes made by others. The 4-1000 was bought from Eimac for limited resale to users of RCA VHF TV transmitters. Eimac likewise supplied RCA's 304TH for resale to the private-brand market. RCA's 862A and 898A 100-kW tubes were originally made by GE, then by Federal Telephone & Radio.

CRTs. RCA was, of course, a major force in cathode-ray tubes. Still, low-runner replacement picture tubes were doubtless bought from other makers. The archive material is incomplete (these were "Lancaster," not "Harrison," types), but it is known that 3MP1 'scope tubes were bought from GE. Additionally, the Salt Lake City plant of Eitel-McCullough made a range of black-and-white picture tubes for RCA Victor, including the 10BP4, 16AP4, 16GP4, 17CP4, 19AP4, 21AP4, and 24CP4.

Part 1 of this article appeared in the August, 2000 issue. Parts 1 and 2 copyright © 1999, 2000 by Ludwell A. Sibley.

THE VACUUM TUBE

EDITED BY **LUDWELL A. SIBLEY**, 102 MCDONOUGH RD., GOLD HILL, OR 97525-9626

PLEASE INCLUDE SASE FOR REPLY. COPYRIGHT © 2000 LUDWELL A. SIBLEY.

New Douglas Book Now Available

Alan Douglas is well known to the antique-radio community via his beautifully written *Radio Manufacturers of the 1920s* series, and through 25 years of articles in the collector press. Now he's changed directions with *Tube Testers and Classic Electronic Gear*, the new release from Sonoran Publishing introduced at Rochester.

This is an exposition of tube-test techniques and equipment, far more insightful than the limited information in, say, RCA's handbooks. The author compares the various methods to measure tube quality, giving their strengths and limitations. He discusses ways to get actual calibration of common testers and do automatic curve-plotting, then leads through a description of the product lines of 23 main makers and some smaller ones. Military testers are included in detail. A bit of wit and charm eases the reader through the technical aspects.

The format is a bit like that of *Radio Manufacturers of the 1920s*. The idea is to give some company history, some biography on "famous figures" in test-gear, lots of technical details, sharp present-day photos of the equipment, and enough old-time ads to show a company's marketing approach.

This book is not "just tube testers," either: Douglas devotes the last third to other test gear (VOMs, VTVMs, Q-meters, grid dippers, bridges, signal tracers, and oscilloscopes). He gives fine insight into how whole classes of instruments developed, like John Rider (of Rider's manuals fame) and the vacuum-tube voltmeter; or how Hewlett-Packard aced out General Radio in audio oscillators; or how Howard Vollum's Tektronix made Du Mont's 'scopes irrelevant. This, plus case histories of restoration of ailing instruments and a detailed index.

Readers likely to benefit from this book range from the interested beginning restorer to the grizzled boat-anchor enthusiast. The volume will encourage those who are building up a testbench of gear to choose some of the excellent lab-grade equipment now widely/cheaply available, over more familiar but junky mass-market stuff.

The technical details by Douglas are impeccable, the layout by George A. Fathauer is crisp and pleasing, and the book is simply a winner. It's available from (at least) Antique Electronic Supply, A.R.C., George H. Fathauer & Associates, Amazon.com, and Barnes & Noble Online. ISBN 1-886606-14-5. Please see Bill Denk's review of the same book in *The OTB*'s "New Books and Literature" column for complete cost and size specifications.

Series-String Tubes For 100 mA

Hank Olson's article on the AC-DC receiver (*The OTB*, May 2000) is a comprehensive story, but omits a little known sideline in tube history: RCA's and Sylvania's line of reduced-current tubes.

The classic "All-American Five" tube lineup, in either its original octal version or the miniature series that replaced it, drew a heater current of 150 mA. The miniature types were, of course, the 12BE6- 12BA6-12AV6-50C5-35W4 family.

The British version of the AC-DC radio typically used tubes drawing 100 mA, but at a higher per-tube voltage so as to add up to a line voltage of 240. But the story in the U. S. also included a line of 100-mA types. Between late 1958 and mid-1960 Sylvania and RCA took out industry registration on a new lineup, comprising the 18FX6-18FW6-18FY6- 34GD5-36AM3A.

RCA Victor, for example, used these types in a few sets of 1961 vintage. These were the 1-RA-3, -4, -5, and -6 series using the RC-1202N printed-circuit chassis. The same PC board appeared in the 1-RD-3, -4, -5, and -6 series. Sylvania weighed in with the 630- and 651-series printed-circuit chasses, using them in clock radios of Models 5T10B, 6010, and 42 related versions.

The heater voltages were rejiggered: 35 volts at 100 mA gave enough emission in the output and rectifier tubes, while each of the low-level stages got 18 V at 100 mA instead of 12.6 V at 150 mA—the same heating power.

In a break from the 35W4 rectifier, there was no provision for a pilot lamp. On the 36AM3A, the pilot-lamp section of the heater was re-rated

at four volts and redefined as a safety fuse (required by Underwriters' Laboratories) in case of a short in the B+ circuits.

RCA *Application Note AN-189* ("New 100-Milliampere Tubes for 120-Volt Series-Heater-String Home Radio Receivers"), from Nov. 1960, cited a few advantages of the new tubes. The reduced power cut the hot-spot temperature of the cabinet by 15% to 25%. This allowed smaller cabinets without warpage or color change, or cabinets with better acoustics via smaller vent holes. The inrush current upon turning the set on was less, and was better distributed than with the conventional lineup.

The most obvious advantage, reduced power consumption, is not even mentioned in the AN, a sign of the '50s attitude toward energy consumption. The same application note plugged the new 20EQ7, a nine-pin diode-pentode equalling an 18FX6 with a detector function added, and the 50FK5, a high-sensitivity output tube. These two were intended for use in four-tube "economy" radios with the tube lineup 18FX6- 20EQ7-50FK5-36AM3. This was a more advanced design than the normal four-tuber where the 12BA6 IF stage was simply left out.

For restoring a receiver using these tubes, 100-mA tubes are still available through the usual sources. For sets that do not use a pilot light, it is possible to change everything over to the 150-mA family…but general restoration philosophy is to keep the set "original."

RCA sales projections for these tubes appear in the Dowd-RCA Archive. For the 18FW6, as of 1960, expected sales were 450,000 units in the first year, 1,000,000 in the second, and 1,500,000 in the third. Yet in 1963 this type was "limited to extent of inventory," i. e., on the way out. The same sales projections, and the same fate, applied to the 18FX6 and 18FY6. The 34GD5 and 36AM3A lasted until 1966. Eventually "A" versions of all the 100-mA tubes (and a 36AM3B) appeared, having a controlled warmup time of 20 seconds, but the commercial opportunity was gone.

This market failure may have resulted from insufficient sales persuasion applied by the Tube Division to the RCA Victor Division, which used the conventional tube lineup in its other 1961 models, and dropped the 100-mA versions in later years. Engineering improvement is nice, but cost reduction would have been easier to sell. RCA's "example" AC-DC receiver design in the RC-22 through RC-26 tube manuals uses the 150-mA line of tubes.

The 100-mA idea was not limited to radios. RCA's Application Note AN-190 ("AC/DC Stereo Amplifiers Using Output Tubes Having 100- Milliampere Heaters"), also of Nov. 1960, promoted the 34GD5, 50FK5, and 60FX5 as output tubes for low-cost phono amps giving a watt or so per channel. One low-cost design used half of a 20EZ7 duo-triode (a 100-mA 12AX7) driving a 34GD5 for each of the two channels, with a shared 36AM3A rectifier. Power output was 1.0 watt per channel.

Replacing the 36AM3A with a silicon diode for higher B+ voltage, and sending in 50FK5s to keep the total heater voltage at 120 volts, raised the output to 1.25 watts per channel.For a really cost-reduced design, a pair of 60FX5s driven directly from a ceramic pickup gave 1.1 watts (of Elvis or Mantovani) per channel.

Tubes at Rochester

"Tubes" were an important topic at Rochester this year. The flea market yielded its usual surprises in terms of tubes and tube literature. One delighted collector went home with a Western Electric "S" tube of 1915 vintage. The international audience at the Conference usually contains a strong contingent—or a predominance—of tube enthusiasts. This year was no exception, with attenders from (at least) Australia, Britain, Germany, Holland, Japan, and Sweden.

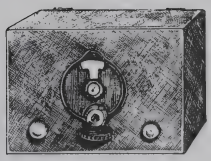
As with last year's event, the main "tube" session was sponsored by the Tube Collectors Association. Major collector Al Jones introduced the session. Lauren Peckham did a show-and-identify talk on a dozen rare tubes that had been brought in by Barney Wooters, a fellow long-term collector. Jim Cross, who wrote a major *OTB* article on the Van Horne Tube Co. a few years back, gave an insightful talk on the history of Sylvania and Hygrade Sylvania up to ca. 1935. This was the result of an information-gathering trip to Emporium, PA, where most of the company's early buildings are still present. Your tube columnist gave a report on the status of the tube industry: it's still there, although reduced to more or less "boutique" status, and has become strongly internationalized. The session concluded with a demonstration of a working 857B rectifier, blue glow and all.

Rochester has often been the place to announce new tube-related books. This year saw two. Mamoru Fujimuro had a few copies of his fine new Japanese-language text on receiving and audio tubes for sale. George A. Fathauer of Sonoran Publishing released Alan Douglas' excellent work on tube testers and related testgear. There were also hints of a future, nicely done,

(continued on page 46)

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



Upcoming Events

Another successful AWA Conference has come and gone. Unfortunately, I was unable to attend this year but my friend, Tim Walker, W1GIG, filled in for me for the amateur Hour together with Randy Haus, KB2PLW. Reports were that the "Hour" had a good turnout, including some newcomers. Many thanks to all, and I hope to see you all next year.

To the newcomers especially, if you need help with parts that you can't find, write to me. I have most parts, or if I don't have them I know where most of the parts live. No cost to you except for shipping.

Rules and times for our winter events are listed below; they are the same as last year, except for date changes.

Bruce Kelley Memorial 1929 QSO Party for December, 1999

This year, the Bruce Kelley Memorial 1929 QSO Party is scheduled for the first and second week in December, that is December 2-3 and again December 9-10. We are hoping that these dates will avoid the QRM that we have been experiencing in the past. We shall see!

Log sheets and the information data sheet will be sent out about November 15th to all those who returned log sheets for the previous '29 Party. Others who desire log sheets may write to me.

Finally, PLEASE send your logs in early. Most of you do, but a few are slow. I have a deadline to get the results to our Editor.

- *Dates and Times:* December 2-3 and December 9-10. Start Saturday at 2300Z (6:00 p.m. EST) and finish Sunday at 2300Z (6:00 p.m. EST), both periods.
- *Objective:* Contact as many other AWA members as possible. Exchange RST, name, QTH, type of transmitter, year and power.
- *Rules:* Transmitters must be 1929 or earlier self-oscillator designs such as the Hartley, TNT, PP tuned grid tuned plate, MOPA etc. Participants are encouraged, but not required to use straight keys.
- *Power:* Transmitters are limited to a power input of 10 watts or less. However, between the hours of 500Z (12 p.m. EST) and 1300Z (8 a.m. EST), power may be increased to 20 watts to help make E-W contacts.
- *Frequencies:* Operate between 3550 KC and 3580 KC.
- *Logs:* Send all logs to John F. Rollins, HC33 Box 150, Arrowsic, Maine 04530.

Linc Cundall Memorial Old-Time CW Contest for January 2000

The annual Old Time CW contest will be held during the last week in January.

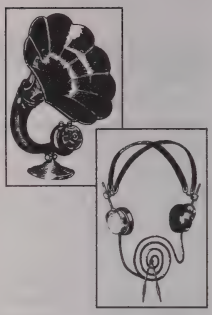
Log sheets and information sheets will be sent out about January 15th to all those members who submitted log sheets in last year's contest. Anyone else desiring a log sheet may write to me.

- *Dates and Times:* Start at 6 p.m. EST (2300Z) on Wednesday, January 24 and end at 6 p.m. EST (2300Z) on Thursday, January 25. Repeat on January 27 and 28.
- *Objective:* Contact the greatest number of AWA members. When calling, use (for example) "AWA AWA de W2AN." On contact, exchange signal report, name, QTH, year of equipment, such as "TX 36" for a 1936 transmitter and "RX 34" for a 1934 receiver. Send "Mod" for modern (1943 or later) year.
- *Rules:* A station will be scored only once on each band. Non-member contacts, and stations not submitting logs, will not count.
- *Frequencies:* 1800-1820, 3580-3600, 7030-7050, and 14060-14070 kHz +/- QRM. Concentrate 20 and 160 meter contacts on the hour.
- *Scoring:* QSO Zones: "E" eastern zone US Districts 1,2,3,4,8,9 plus VE1 VE2, & VE3; "W" western zone, US Districts 5,6,7,0 plus VE4, VE5, VE6 & VE7. "DX" zone: All others.
- *QSO Points per Contact by Zone:* "E" to "E" or "W" to "W" 1 point; "E" to "W" or "W" to "E" 2 points; "E", "W" or "DX" to "DX" 3 points
- *Equipment Multipliers:* MOD TX *and* RX=1;

(continued on page 46)

RADIO REPRODUCERS

EDITED BY **DAVE CROCKER**, 35 SANTUIT POND RD., #4B, MASHPEE, MA 12649
PLEASE INCLUDE SASE FOR REPLY.



Utah Ship Speaker

When Floyd Paul told me that he was going have to give up writing "The Loudspeaker" (see "From the Editor" in our last issue), he also told me that he had hand-picked his successor. The gentleman he named was Dave Crocker, and as you can see Dave has accepted the assignment.

An active radio collector for over thirty years, Dave is known for his Crosley research. For the last eight years, he has been developing a specialized collection of horn speakers. Dave has served on the editorial staff of Antique Radio Classified *magazine and his articles have appeared both in* ARC *and in this publication.*

When we began to talk about the new column, I asked him to consider broadening its scope to include headsets and paper cone speakers. Cone speakers have never, to my knowledge, been the subject of a regular OTB *column and we lost our headset coverage with the passing of Dick Mackiewicz a few years ago.*

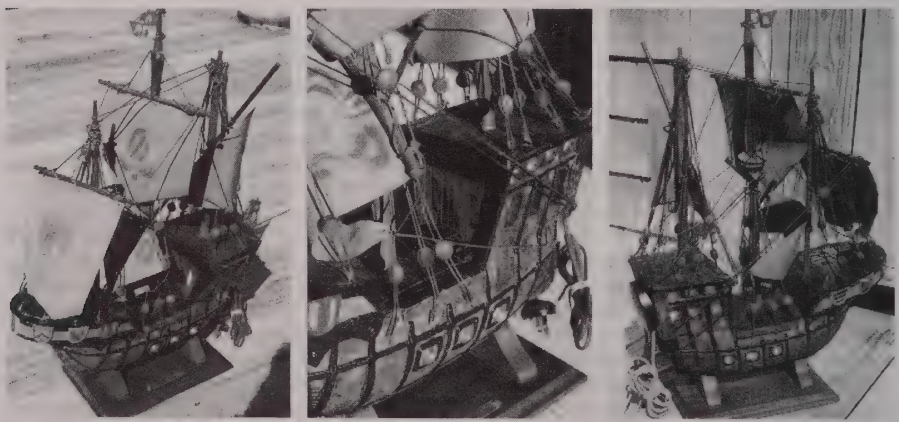
Dave was enthusiastic, and hence the new title. Please join me in welcoming him aboard! I hope that we will be enjoying his "Radio Reproducer" lore for many years to come.—MFE

This is one of the most unusual horn speakers I have ever seen. There are other, more common, wooden ship speakers with paper cone speakers integrated with the sails, but this model is a horn-type speaker mounted inside a plaster ship model!

No manufacturer's name appears anywhere, and the only other one known to exist (in Ralph Muchow's collection), was labeled "Utah" by Ralph himself—either through his research or because of the brand name of the large reproducer mounted in the rear. It is a manufactured unit, however, since the notice "Pat. Pending" is cast into the keel.

The ship is a true open-ended horn with the driver set deep into the rear of the cabin section. The driver is connected to a square metal tube that abruptly angles downward, and then ends horizontally amidship under the deck. The remainder of the sound chamber is the actual plaster hull itself, and the sound resonates out an

(continued on page 46)



I've included three views of the "Utah" speaker so you can enjoy its fascinating detail. Note the driver unit in the stern and the holes placed atop the bow for the sound to exit (right-hand picture).

MICS AND MEN

EDITED BY **GEORGE A. FREEMAN**, 102 E. MAIN ST., MADISON, IN 47250-3411. PHONE (812) 265-6878.
E-MAIL RALOGEUM@AOL.COM. *PLEASE INCLUDE SASE FOR REPLY.*

The Mic: Rockwell
The Man (and Woman): Guy Lombardo and Ruth Lyons

In preparing an exhibit for AWA's 2000 Conference Crosley theme contest, I realized I had the beginnings of a story on a rare microphone, the Rockwell.

R. J. "Rocky" Rockwell, Vice President and Director of Engineering for Crosley Broadcasting's WLW, Cincinnati, was a "fanatic on quality."[1] Among several major achievements, he designed, and had built from scratch in 1956, a new WLW high-fidelity 50,000-watt transmitter. The effort included the entire audio chain. Rockwell designed and built even the phonograph tone arms, cartridge pick-ups and microphones.

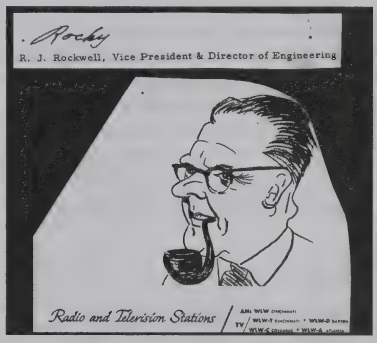
The Rockwell mic shown here is the final version of the three or four different models that were developed. Frequency response exceeded 20 kHz on the high end and was capable of recognizing sounds as low as 40 to 50 cycles on the low end of the audio scale. WLW engineers fabricated their own acoustic box to generate signals that would excite the air to these extremes. "They were the ultimate microphone. Nothing else could compete with the Rockwell mic."[1]

Rockwell microphones were built for use at WLW stations only and were not available for sale outside the Avco-Crosley organization. The Rockwell mic seen at AWA 2000 was on loan from the Jack Gray Museum in Cincinnati. Less than 12 Rockwell microphones were made.

The photograph[2] shows long-time Cincinnati broadcaster Ruth Lyons interviewing band leader Guy Lombardo. The WSAI mic flag on the Rockwell documents Powel Crosley's ownership of the station. FCC rules later forced him to sell it.

However, today's consolidation and growth of huge radio groups is manifest in the return of WLW and WSAI call letters to one organization, Clear Channel Communications. Clear Channel owns over eleven hundred radio stations, plus television stations and billboards, around the world.

Rockwell mic provides hi-fi pickup as Ruth Lyons interviews Guy Lombardo.



"Rocky" as he appeared in a 1958 caricature.

Here's the distinctive mic as used in an advertising logo.

SOURCES:

1. Telephone interview 9/3/00 with former WLW engineer and long time media broker Clyde Haehnle in Cincinnati.
2. WSAI photo and Rocky caricature courtesy of Clear Channel Communications, Inc.

VACUUM TUBE, *continued from page 42*

book on early U. S. receiving tubes, which will probably be ready for next year's event.

This year's awards ceremony saw the Tyne Award presented to visiting Australian author Fin Stewart, veteran of two books (*Illustrated History of Philips Radio Valves, History of GEC and the Marconi Osram Valve*) and of innumerable tube articles in the Aussie collector press and AWA publications.

The Equipment Contest featured a real rarity. William Ross entered an exhibit covering the prewar American Television Labs in Chicago, run by the energetic Ulises A. Sanabria. Centerpiece of the display was a complete picture tube, hand-made from a large Ehrlenmeyer flask by a student in the school as part of the regular training—an activity written up in *Radio Craft* in 1938! The "hottest" items in the book auction were foreign tube manuals; the four lots drew vigorous bidding.

The tube auction on Thursday evening contained lots of "important" collectibles: an appealing Spherical Audion, a Delta Midget triode, numerous Australian items, an unusual number of European tubes (civilian and Wehrmacht), some Crookes tubes, and an ocean of Western Electric types. A $10 minimum bid was used to speed the process.

NOTE: Lud's column also included a complete and detailed list of tube auction results, which you will find as part of the "Annual Conference Auction Report" elsewhere in this issue.—MFE

AMATEUR RADIO, *continued from page 43*

OT TX *or* RX=2; OT TX *and* RX 3.

- *Power Multipliers:* input to final up to 4.9 watts=4; 5-24.9 watts=3; 25-100 watts=2; 100+ watts=1.
- *Determining Total Points per QSO:* (1) Find QSO Points for contact. (2) QSO Points × your equipment multiplier × your power multiplier = total points for the contact.
- *Scoring Examples:* **Example 1**, KB2PLW contacts W1FPZ; (a) both are in "E" zone for one QSO point; (b) both have OT TX and RX for a 3 multiplier; (c) both are operating at 10 watts for a 3 multiplier. Therefore the contact is worth 1 pt × 3 × 3 = 9 points for each operator. **Example 2,** W6TDP contacts W2ER; (a) "W" to "E" contact counts as 2 QSO points; (b) W6TDP has OT RX and OT TX running 20 watts; (c) W2ER has MOD RX and OT TX running 50 watts. Therefore the contact is worth 2 × 3 × 3 = 18 points for W6TDP and 2 × 2 × 2 = 8 points for W2ER.
- *Logs:* Send all January OT Contest log results to John F. Rollins, W1FPZ, HC 33, Box 150, Arrowsic, Maine 04530.

RADIO REPRODUCERS, *continued from page 44*

open area on the front deck.

The hull is formed of cast plaster ½-inch thick with hand-painted decorations. The masts and spars are of wood, as is the front cabin section. The shaped sails are formed from thin galvanized metal and also hand-painted.

The superstructure is held together with yards and yards of twine secured to metal"U" nails imbedded into the plaster. It is equipped with wooden pulleys, crow's nest, fabric painted flag, metal cast anchor and even a tiny metal lantern in the upper rigging.

The cabin has parchment inside the window openings, which adds a warm glow when a small light is plugged in from a secondary power cord. The ship model measures a full 25 inches tall from the keel to the center mast, and is 17 inches long from bow to stern.

It is obviously styled after a Columbus-era sailing ship with details from the Santa Maria. Because of its heavy weight, it required a rugged stand, and as the original stand was missing, I fabricated one of my own design and added the brass name plate.

Not many of these unique ship horn speakers exist. Possibly they were not well accepted by consumers because of the poor acoustics of the plaster sound chamber; certainly many were damaged and discarded because of the fragile construction.

BY BILL TIPTON

70.7-Volt Transformers For Output Applications

Audio output transformers are among those once-commonplace items that are becoming increasingly hard to find. In most cases they have to be ordered from one of the larger supply houses at rather steep prices. Fortunately, common 70.7-volt line-to-voice-coil transformers—which often turn up in junk boxes—work just as well for coupling single-ended tube plates to voice coils.

For those of you who are not familiar with sound system wiring, here's a brief explanation: Public address and other sound systems employing multiple speakers use amplifiers designed to produce 70.7 volts RMS at their maximum rated output. This specification was chosen because the corresponding peak voltage is 100 volts, a value that is under the amount at which the National Electrical Code requires speaker wiring to be installed in conduit.

Any number of speakers can be connected across the amplifier output (through line-to-voice-coil matching transformers) until the maximum current rating, and thus the power rating, of the amplifier is reached. The amplifier is stabilized with negative feedback so that its output voltage does not vary appreciably with loading. The secondary of the line-to-voice coil transformer has several taps corresponding to the usual voice coil impedances.

The primary has taps marked with various wattages that correspond to the power the transformer will draw from the 70.7 volt line when properly matched to a voice coil. The primary and secondary taps of the line-to-voice-coil transformer yield a large number of possible impedance ratios, many of them in the range needed to match a tube plate to a voice coil.

By using the formula: $Z=E^2/P$, where E is 70.7 and P is the power in watts marked on a primary tap, the impedance seen by the source can be easily calculated for that tap. Dividing this impedance by the impedance marked on any secondary tap will give the impedance ratio of that primary/secondary tap combination. It's quick and convenient to make a table of impedance ratios covering every tap combination on your transformer.

Now that the possible impedance ratios are known, you'll need to calculate the required impedance ratio for the plate-to- voice-coil circuit in your set. Divide the rated load impedance of the output tube by the voice coil impedance of the speaker and match the result to the closest of the possible impedance ratios of the line-to-voice-coil transformer.

Remember that the wattage marked on any primary tap of the line-to-voice-coil transformer only corresponds to the power that would be drawn from the 70.7 volt line by that tap when properly matched to a voice coil— not the maximum power handling capability of the transformer. The saturation of the primary caused by the direct current of the plate circuit will be the

(continued on page 51)

Primary "Watts"	Secondary Impedance		
	4	8	16
0.31	4,000	2,000	1,000
0.5	2,500	1,250	625
0.62	2,000	1,000	500
1.0	1,250	625	313
1.25	1,000	500	250
2.0	625	313	156
2.5	500	250	125
4.0	313	156	78
5.0	250	125	63
8.0	156	78	39
10.0	125	63	31
16.0	78	39	20

Fig. 1. Possible Impedance Ratios for Common Transformers.

AUTHOR'S ADDRESS: 1332 PINEWOOD RD., JACKSONVILLE BEACH, FL 32250-2941

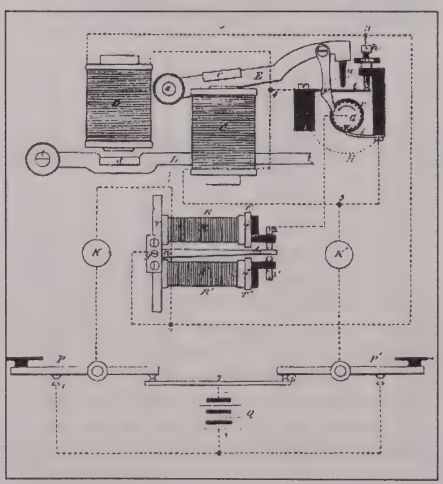
EDITED BY **ROGER W. REINKE**, 5301 NEVILLE CT., ALEXANDRIA, VA 22310-1113
PLEASE INCLUDE SASE FOR REPLY.

Franklin L. Pope—Telegraphic and Electrical Engineer, Part 2

By John Casale, W2NI ©2000, John Casale

(Part 1 of this article appeared in the August, 2000 issue.)

During the year of 1868, Pope began working on what was to become his most noted literary work. Pope's attempt was to provide a complete handbook for the average American telegrapher and electrician to use in the field and for aspiring students. With great expectations, the first edition of T*he Modern Practice of the Electric Telegraph* was published in May of 1869. It immediately received glowing reviews from both the industry and the general press.



The Pope and Edison "Type-Printing Telegraph"

We know of no other work of the kind so well adapted as this is to all who desire to become intimately acquainted with the wonderful science of the electric telegraph—The New York Herald

Your illustrative diagrams are admirable and beautifully executed...I think all your instructions in the use of the telegraph apparatus judicious and correct, and I most cordially wish you success—Samuel F.B. Morse

The first edition sold out in four weeks. By 1895, it had been published in fifteen editions and in multiple languages. It was adopted as a textbook by the United States Signal Service. Pope's clarity of description and the use of his own practical experiences helped readers understand basic principles. In the following excerpt from his 1869 book, Pope explains to student telegraphers the importance of the time (spaces) between the dots and dashes, that when properly combined, create the alphabet and words used in the language of Morse.

The value of these spaces should be carefully impressed upon the mind of the learner. Beginners are apt to conceive that the Morse alphabet consists solely of dots and dashes, and this misconception has a tendency to greatly increase the time required to become good "senders." Uniformity and accuracy in spacing is of no less importance than in the formation of the letters themselves. The foundation of perfect Morse sending lies in the accurate division of time...

By 1869, Pope was nationally recognized as an established telegraph engineer. During that spring, the 22-year-old Thomas Edison involved Franklin Pope in experiments with his new "Double Transmitter." Edison's transmitter allowed two communications in opposite directions at the same time on a single wire. Just prior

AUTHOR'S ADDRESS: 3 PICKERING LANE, TROY, NY 12180

to Edison's permanent move from Boston to the New York City area, Pope and Edison conducted tests and modifications to the transmitter together in New York. Edison then traveled to Rochester, N.Y. to test the transmitter over a 400-mile segment of a line belonging to the Atlantic and Pacific Telegraph Company.

In the summer of 1869, Pope resigned his position with G&S Reporting Tel. Co. and by the fall entered into a partnership with Edison and James Ashley, editor of *The Telegrapher*. They formed the electrical engineering firm of Pope, Edison & Co. At this time, Edison had very little money to his name. He boarded at Pope's family home in Elizabeth, New Jersey. Pope also lent Edison his daily spending money, as little as fifty cents a day at times.

The two men formed two companies during their partnership: The Financial and Commercial Telegraph Company and The American Printing Telegraph Company. Pope and Edison jointly filed for patents in printing telegraphy during this period. Three printers were invented to be marketed by their companies. The first two printers, also known as stock tickers, were intended to provide gold and stock quotations in the New York area. The third printer, "The Pope and Edison Type-Printing Telegraph," was intended to be used on private lines, transmitting messages other than commercial quotations for "individuals and business houses." The American Printing Telegraph Co., according to 19th century author James D. Reid, was the first company to enter this business.

The award-winning printer Pope and Edison designed for the application was intended to be operated by anyone. It consisted of a printing mechanism with a circular dial containing the alphabet and figures, along with two telegraph keys. Pressing one key would simultaneously advance the transmitting and receiving dials one step at a time, using one polarity of current. Once the appropriate character desired was in position on the dial, the other key was pressed, generating the opposite polarity and activating the printer. Although it was slow, it was very effective and was sold to various businesses on the east coast and in the San Francisco area. Both companies were eventually absorbed by the Gold and Stock Telegraph Co., which essentially dissolved the Pope, Edison partnership.

In the early 1870s Pope patented some of his important inventions in the field of railroad signaling. One of them was a semaphoric block signal system that was adopted by several railroads. In this system, Pope created circuits out of segmented rails that were separated by small pieces

Sounder by F.L. Pope & Co.

of hardwood. The rails were connected to various relay schemes utilizing local batteries and telegraph relays, which included duplex and neutral types. They were connected in such a way as to signal to remote semaphores, over telegraph lines, the approach and passing of trains that traveled within a particular section or "block" of track.

Pope's inventions were marketed by The Electric Railroad Signal Company in New York, and he was listed as their engineer. During this same period, Pope was in business as a manufacturer and dealer in telegraph instruments and supplies operating under the name of F .L. Pope and Company. Both companies were located at the same 38 Vesey St address.

By 1875 Pope had become a counselor and patent expert for the Gold and Stock Telegraph Company. He was one of the first to specialize in electrical patents. The inventor was later recruited by Western Union's president William Orton, at a salary of Pope's choice, to hold a similar position with that company. There were few patents worth anything in the telegraph industry that Western Union did not control. Pope had the enormous responsibility of defending Western Union's patent rights and securing additional patents that would be beneficial to the company.

Beginning in the 1880s, Pope set off on his own and conducted business as a patent attorney and consultant. He assumed the editorial management of *The Electrician* magazine, changing its name first to *The Electrician and Electrical Engineer*, then to *The Electrical Engineer*. He was one of the highest paid consultants in the country and was retained by companies such as Postal Telegraph, Westinghouse, and American Bell Telephone. He also represented Jessie H. Bunnell on his historic 1881 steel-lever key patent, which became the standard telegraph key pattern used in the U.S.

continued →

Mr. Pope's former home in Great Barrington, MA is now a bed and breakfast called "The Wainright Inn."

He was frequently hired as an expert witness and was present at some the more important patent cases during the 19th century. It is interesting that Pope was seldom called to the stand. His presence in the court room as a well known expert, with inflexible honesty, often seemed to be all that was needed. He frequently turned down large retainers if he did not agree with the case.

Pope's ability to dissect a topic, then explain it in a pleasant and graceful style and with bell-like clarity, can be characterized as simple brilliance. He made contributions to several technical journals in this country on an array of topics associated with the emerging technologies of the late 19th century. His historical interests are reflected in his comprehensive work documenting the development of the incandescent lamp and the electric motor. In his articles on the history of the telegraph, he gave special recognition to the contributions of Joseph Henry and Alfred Vail as well as to Morse. The historical impact of Pope's pen is best illustrated by his contributions to the encyclopedias of that era.

In October, 1895, both the general public and the electrical community were stunned by newspaper headlines such as "Inventor's End," "Franklin Pope Killed by Electricity," and "Felled by the Power He So Long Mastered." People familiar only with his telegraph career and the relatively safe operating currents of telegraph equipment wondered how such an accident could have happened.

Looking out of the fateful basement window from Mr. Pope's former workshop.

It seems that in 1894 Pope moved back to Great Barrington and remodeled the home where he had lived as a boy. He took on the job of re-engineering the electric light power system in the city. Pope converted the system from steam power to hydro power, doubled the operating voltages, and improved the distribution throughout the city. To evaluate his efforts he ran a 2100-volt aerial distribution line into his own workshop. He originally ran it underground, but rerouted the line through a basement window after having problems with grounds that developed during heavy rain.

He needed to evaluate the capabilities of the distribution converters (1050- to 52-volt step-down transformers) that had remained around the city from the previous system, so he installed two well-used examples of them in his basement workshop. Pope found by connecting two in series, he was able to re-use the old converters to deliver 105 volts on his 2100-volt system.

One Sunday evening during heavy rain accompanied by strong winds, residents of the city reported flashing as wet branches hit and rested on the power lines. With the lights dimmed in his home, Pope took a lantern that was low on fuel down into the basement to inspect the converters and his meter. The wind had blown open the basement window, allowing rain to dampen the basement floor and the converters, which were mounted two feet away from the window. He reached up to close the window and, as he pulled back, the back of his right hand made contact with a converter and/or the tapped splice that connected the distribution line to the converters.

The electrical experts who gathered in Great Barrington to attend the funeral constituted a "Who's Who" of the American telegraph and electrical engineering fields. Among them was a small contingent, representing the American Institute of Electrical Engineers, who were also there to investigate the accident. This group included eminent AC power engineer William Stanley Jr. and Edward Weston, of Weston Instruments, both good friends of Mr. Pope.

The converters were bench tested in Great Barrington by Weston and Stanley, who found a primary lead of one the converters shorted to its case. Because of the publicity surrounding Mr.

Pope's passing, and the subsequent report by the AIEE, new safety and grounding codes were established for the young electric power industry.

The day after the accident, Mr. Pope's wife, Amelia, as a show of confidence in her husband's design, ordered their home electric light system repaired and put back into service. Left unfinished in Pope's typewriter that Sunday evening was his article "The Distribution of Electric Power at Niagara."

When Mr.Pope was researching the life and career of Joseph Henry in 1878, he wrote:

There is to me a singular fascination in tracing the footsteps of the pioneers of science and discovery; in visiting the places which have been the scenes of their struggles, their disappointments, and their triumphs; in handling the crude and roughly fashioned apparatus, frequently the work of their own not unskillful hands; and in gathering from the lips of eye-witnesses the anecdotes and reminiscences which tell the story of their lives, and work, and studies.

My own modest attempt in tracking the footsteps of Mr. Pope eventually led me to the place where his tragic death occurred. As I stood alone in the dark and dusty corner where his basement workshop had been, I was struck by a feeling of emptiness. In this now-vacant room, my flashlight revealed evidence of where those infamous converters were once mounted. After being there awhile, the emptiness was replaced with a deep respect for the life of a man who once influenced so many, over a century ago, and the hope that his work and accomplishment will be remembered far into the future.

NOTE: For a copy of the extensive bibliography used in compiling this two-part article, send a SASE to the author.

7.07-VOLT TRANSFORMERS, *continued from page 47*

limiting factor of power capability as is true for conventional plate to voice coil transformers.

A single-ended audio amplifier must operate in class "A" mode, biased about midway between cutoff and saturation so that the average plate current stays about the same for any level of power output within the ratings of the tube. The current rating of the line-to-voice-coil transformer can be calculated by dividing the rated wattage of the highest power tap by the nominal line voltage of 70.7: I=P/E or I=P/70.7, where P is the rating of the tap in watts.

The current rating of the transformer should be about twice the rated plate current of the tube plate circuit to allow for the saturation effect. The increased voltage of the tube plate circuits does not pose a problem. Peak plate voltage under full power will be about double the zero-signal plate voltage, giving a worst case of less 1,000 volts. I tested several line to voice coils with this voltage applied over a long period of time; none of them failed.

I have worked out all the impedance ratios and the maximum primary currents for most of the common line to voice coil transformers (Figure 1) and also transformer current ratings for some typical "highest power" taps (Figure 2). The current figures incorporate a 2-to-1 derating to allow for the saturation issue. Here are some example calculations:

Largest Primary Tap	Maximum D.C. Rating (mA)
4	28
5	35
8	57
10	71
16	113
20	141

Fig. 2. Plate Current Ratings for Common Transformers (Derated 2 to 1 — See Text)

Example 1

6F6, 2A5 or 42: load=7,000 ohms. I_p=38 ma.
With a 4-ohm voice coil, Z ratio= 1,750. Referring to Fig. 1, the .62 watt primary tap and the 4-ohm secondary tap or the .31 watt tap and the 8-ohm secondary tap will give the closest value. Referring to Fig. 2, a transformer with a "highest wattage" tap of 8 or more will suffice.

Example 2

45: load= 3,900 ohms. I_p=34 ma.
With an 8-ohm voice coil, Z ratio = 488. There are several combinations shown in Fig. 1 that will give 500. Fig. 2 shows that a transformer with a "highest wattage" tap of 5 or more will work.

BY DR. HUGO HOLDEN

GRID LEAK DETECTION IN THE 1920s—*Part 1*

In the last "Letters" column I announced that I would no longer be able to print extensive responses to Ken Owens' provocative article on Grid Leak Detection (February, 2000 OTB*). Little did I know that, winging its way to me from Australia, was the following long and thoughtful article by Dr. Holden. Since it is an article and not a letter, I guess I'm not going back on my word by printing it. But, gentle readers, if you are moved to write a letter more than two paragraphs long in response to this article, please send it directly to Dr. Holden! Thanks for your understanding.—MFE*

Background

The inspiration for this analysis of grid leak detectors came about after reading D. K. Owens' excellent original article in the Feb. 2000 issue of *The OTB*. His article involved the evaluation of the effect of tube bias conditions on the 200-A and 20l-A detector tubes.

Having recently acquired my first 1920s receiver (a Grebe MU-l), I was very interested to examine the function of the detector, and specifically the effects of using different values of the glass/carbon grid leaks. A number of manufacturers made these in the '20s and the user had the choice of many different brands and values. Much like tubes of the time, these were marketed with very colorful advertising and promises of superior performance.

The question is "How and why do different values of grid leak affect the fidelity of the signal?" This analysis reveals some startling features of the typical 1920s designs.

Understanding AM Detectors

As is usual the best place to start is at the beginning, with the simplest detector circuit, see Fig. 1. This arrangement is the familiar half-wave circuit. Positive peaks of the RF carrier voltage cause diode conduction and the capacitor, Cl, is charged, discharging between the peaks via the resistor, Rl.

Between the positive peaks of RF carrier, the diode is reverse biased. The RF voltage can be represented graphically (Fig. 9). The output from this detector tracks the envelope of the positive half cycles of the RF carrier, and the voltage developed across R1 and C1 is the recovered modulation, called +DET or positive detection.

With proper proportioning of values the signal has the serrated character illustrated in Fig. 10. Between the positive peaks, the detected signal falls away exponentially as the capacitor discharges via the resistor. This voltage is "updated" on the crest of each succeeding cycle of the RF carrier (shown as the dotted lines under the recovered signal for illustrative purposes).

If the diode is reversed as in Fig. 2 then this is negative detection, -DET, and the negative envelope of the RF signal is detected as shown in Fig.11. This is just as satisfactory, since the AM carrier is symmetrical about its zero axis. This -DET circuit can easily be evolved into the grid leak detector circuit as will be shown. However in the analysis of the frequency response of the detector the easiest one to use is the +DET due to the positive voltage convention.

Taking the -DET circuit of Fig. 2, we move the earth to a different position, (Fig. 3), and simply re-draw the circuit (Fig. 4). Now the voltage with respect to the earth or ground connection (measured across the diode) is a combination of the RF carrier and the detected voltage across the resistor and capacitor. This is represented graphically in Fig. 12.

Using a good silicon diode and efficient detection, the positive tips of the RF carrier get "clamped" a diode voltage drop above ground. Tube diodes are resistive and the "clamping" is less effective. The carrier peaks rise up above

P.O. BOX 918, MAROOCHYDORE, 4558, QUEENSLAND, AUSTRALIA

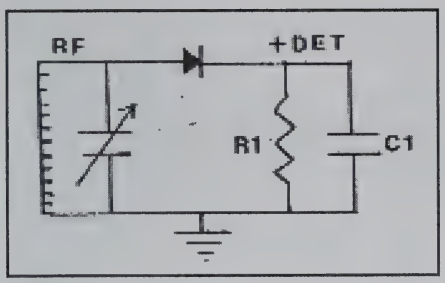


Fig. 1.

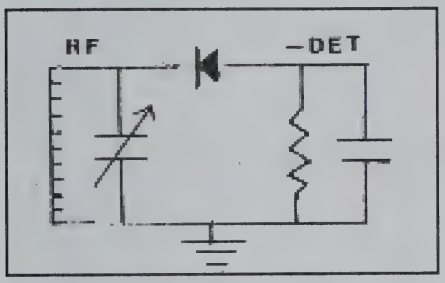


Fig. 2.

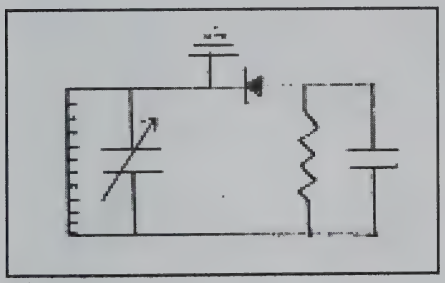


Fig. 3.

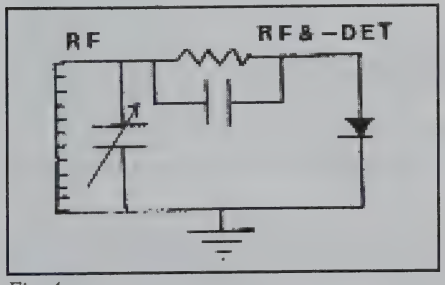


Fig. 4.

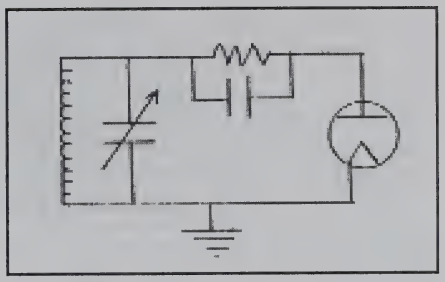


Fig. 5.

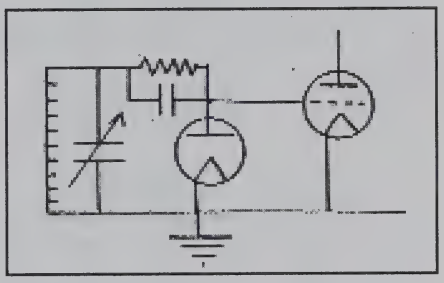


Fig. 6.

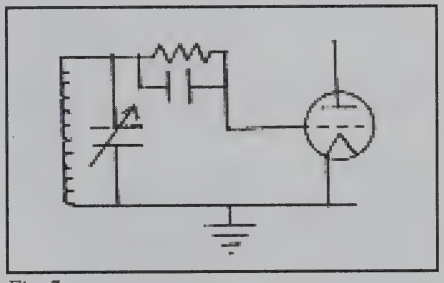


Fig. 7.

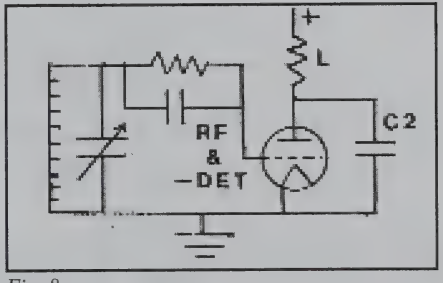


Fig. 8.

Fig. 9.

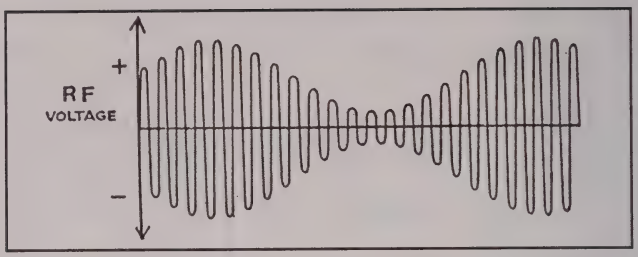


Fig. 10.

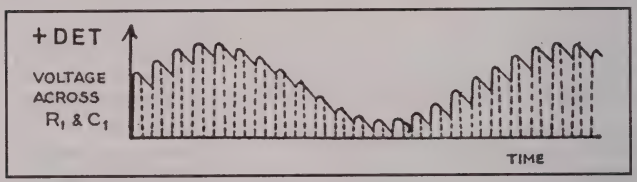


Fig. 11.

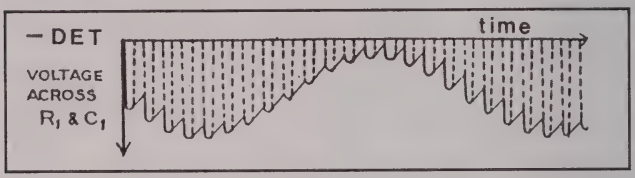


Fig. 12.

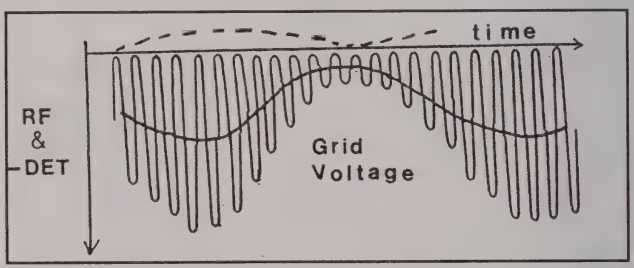


Fig. 13.

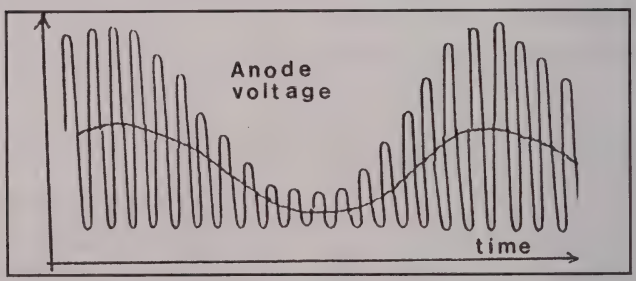
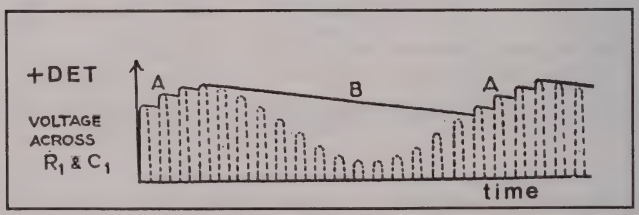


Fig. 14.



the reference level when the carrier amplitude is higher, to some level, as indicated by the dotted line on Fig. 12.

The detection is less efficient on account of this; and the demodulated signal amplitude is reduced, however, it still works. The solid line in Fig. 12 represents the DC axis of the signal for illustrative purposes only, and as can be seen this is the recovered "modulation." This is essentially the signal present at the grid of a grid leak detector.

Moving on to Fig. 5, the semiconductor diode has been replaced by a tube diode, and in Fig. 6 an amplifier has been added. The amplifier's grid/cathode behaves as a diode, so you can remove the original diode (Fig. 7), and the circuit function is the same, assuming of course that the grid/cathode is as efficient as the original tube diode, which for practical purposes is reasonable.

However the effective diode function is moderately resistive. In circuits Figs. 4 through 8, the resistor can be returned to the opposite side of the tuned circuit with minimal effect except that the capacitor's discharge pathway includes the RF coil.

The tube's grid voltage (again see Fig. 12) results in changes in the tube's anode current, so a voltage is developed across plate load L (Fig. 8). Again an RF voltage (Fig. 13), which is amplified and 180 degrees out of phase, appears on the plate. Again the solid line in the graph of Fig. 13 represents the DC axis of the signal, or the average value. So when the RF carrier is filtered off the plate by C2, the modulation is recovered.

The Grebe MU-1 has a very satisfactory arrangement here; the plate load is the primary of a 1:5 ratio transformer with an grounded core. In addition, the transformer has no response at radio frequencies. The residual RF not fully filtered off cannot pass to the secondary. In addition, the audio voltage is stepped up by a factor of 5 to drive the grid of the first audio stage. So the transformer performs two functions. This should not be forgotten when one considers replacing a failed transformer with an RC network. A substitute RC network cannot duplicate this exactly.

Frequency Response of the Detector

If the product value of Rl and C1 (i.e. the time constant) is too long, then distortion results in the detected waveform. In general this takes the form of negative peak clipping of the recovered modulation. This occurs with the high frequencies first. The effect is to degrade the clarity of the audio, producing a "woolly" or "muddy" sound. This is illustrated in Fig. 14, region B.

During this period the diode is reverse biased and Cl discharges via Rl with the familiar exponential waveform. Regardless of detector efficiency, i.e. various tube types, diode or grid/filament of triode, or semiconductor, the behavior of the circuit, between RF voltage peaks, is independent of the diode and dependent on the RC network. It is the analysis of this RC circuit that is important in determining the detector function.

I found it necessary to devise a way to predict the upper frequency that a particular RC filter could support without distortion, and the results are quite remarkable when one considers common values used in detector circuits of the 1920s.

The value of the capacitor associated with the leak is chosen to be relatively large with respect to the tube's (or diode's) input capacity, but not so large that too small a value of grid leak resistor is needed. The lower the value of R, the heavier the loading on the driving tuned circuit.

Also, the efficiency of detection drops due to the diode's forward resistance when the resistor is too low in value. Typical capacitors for this purpose range from 100pF to 250pF (100pF is the superior value). This leaves one with the value of the grid leak to determine the circuit performance. Again this was a "user" variable in the 1920s.

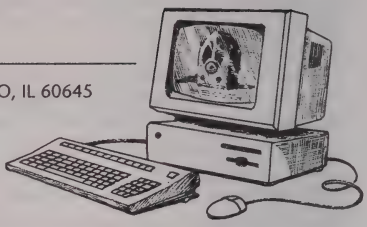
The ability of the detector to resolve higher audio frequencies without distortion depends on the value of Rl and Cl and the depth or extent of modulation. Negative peak clipping, if it is going to occur, will always be worse with heavier (deeper) modulation. We need to be able to calculate the maximum allowable value of grid leak resistor, and the associated capacitor, before negative peak clipping and distortion of the higher audio frequencies occur.

After consulting a number of texts, including Terman, it was clear that the formula was not easily forthcoming. Therefore I have solved the problem using two methods, also there is a third way that can be deduced from a concept presented by Terman.

Part 2 (Conclusion) of this article will appear in the February, 2001 issue of The OTB.

ON THE INTERNET

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com

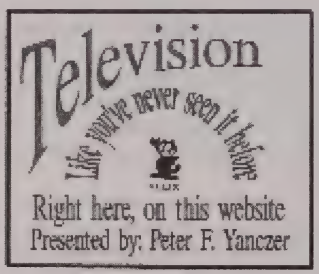


Antique Television on the Web

Since we've discussed many sites that deal with radios, I'd like also to give early television its due. Since I am in the broadcast television industry, I should have thought of it sooner! Can't see the forest for the trees, I guess. Early television has two distinct lineages: mechanical and electronic, for which I offer some choice websites for you to enjoy. These links deal with all aspects of early television; the hardware, the inventors and the programs many of us baby-boomers grew up with.

Experimental Television Society
http://pyanczer.home.mindspring.com/Tour/

My first offering here is a website created by AWA member Pete Yanczer. Pete offers a



wealth of technical and historical information about early mechanical television devices from the 1928-1932 period. His site also has many resources for actually following in the footsteps of the early experiments and building your own setup!

The Iconoscope: Kalman Tihanyi and The Development Of Modern Television
http://www.mtesz.hu/scitech/history/tihanyi/index.html

History of the Hungarian scientist who worked on the iconoscope camera tube.

World's Earliest Television Recordings
http://www.dfm.dircon.co.uk/rl
By Don McLean

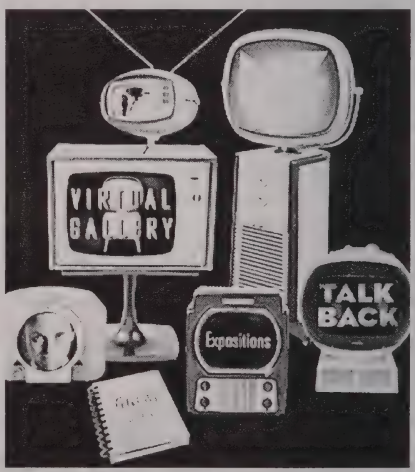
From the dawn of our television technology age comes the restored wonders of original recordings made in the era of mechanically-scanned television!

The Following Program is Brought to You in Living Color
http://www.novia.net/~ereitan/index.html
By Edwin Howard Reitan, Jr.

A well-documented website on the history of early color television—a must see!

The MZTV Museum of Television
http://www.mztv.com

MZTV Museum encompasses 50 years of early North American visual devices, TV receivers and associated popular culture. The MZTV Museum of Television exists as a physi-



cal museum open by appointment and located in the CHUMCity complex in Toronto; and as an e-museum on this Web site.

Museum of Broadcast Communications in Chicago
http://www.mbcnet.org/

The Museum of Broadcast Communications (MBC) at the Chicago Cultural Center is one of only two broadcast museums in America. The Director is Chicago broadcaster Bruce DuMont.

BY PAUL BOHLANDER, W3VVS

RADIO AS IT USED TO BE

Published Courtesy The Phil-Mont Mobile Radio Club, Inc.

— *1927* —

My father had a friend who was a salesman for General Electric Lamp Division of Nela Park (Cleveland). Since the salesman was going to buy a new radio, he offered my father his old one at a very reasonable price. Thus, we became the first family on the block to have a radio, although second-hand.

The set was a 1924 Radiola III-A, manufactured by Radio Corporation of America, and originally retailed for $83.00. The little wooden box was 6¼" high, 12" wide, and 6¾" deep. It used four type WD-11 tubes (detector, audio, and push-pull output). The speaker was a Farrand cone type.

The batteries required were six No.6 dry cells connected in parallel for tube filaments, a 4½-volt C battery for bias, and two 45-volt B batteries for the plate supply.

The "aerial" lead from the radio went through a hole in the living room floor, out the basement wall through a porcelain tube, and up the side of the house on porcelain nail-on insulators. The flat portion of the "aerial" was fastened beneath the overhang of the roof and went completely around the house. The ground system was something to behold; it consisted of a Model T Ford radiator buried in the ground until the neck of the radiator was even with the surface of the ground. A wire was clamped to the neck of the radiator and went into the house and up through the floor to the radio. My father kept the radiator filled with salt water "to make a good ground," he said.

Finally the radio was ready to try out. All batteries were connected and the aerial and ground leads were attached. The speaker was placed on the table beside the little box. My father rotated the two FILAMENT rheostats and the tubes began to glow. There were noises from the speaker like two cats on a back fence, but soon my father adjusted the STATION SELECTOR and AMPLIFICATION knobs to obtain a clear station.

We listened for the station announcement; and the station turned out to be WSPD, Toledo Ohio. With some further adjustment of the STATION SELECTOR, other stations were heard; WWJ and WJR, both of Detroit, and WTAM, Cleveland. Truly, the radio was an instrument for the man of the house with its complicated tuning procedures. However, my mother became skilled at tuning the Radiola III-A and listened to the breakfast club, morning cooking programs, and the news programs.

We lived across the street from the public school. I could sleep late and still get to school on time in the morning. Another advantage was that I could run home at noon for lunch—being a "big" third-grader.

Friday, May 20th, I came home at noon, as usual, ready for my lunch. My mother told me the latest news: a former airmail pilot named Charles A. Lindbergh had taken off at dawn from Roosevelt Field, Long Island, New York, and was on his way across the Atlantic Ocean headed nonstop for Paris, France. I went back to school and told the teacher of the news.

The following evening, Saturday, May 21st, we listened to the radio as usual. It was after supper when the news flash came from WWJ Detroit: Charles Lindbergh had safely landed at Le Bourget Aerodrome, Paris, France, at 10:22 PM French time!

The flight from New York to Paris had taken 33 hours, 30 minutes. Lindbergh's plane, "The Spirit of St. Louis," was built by Ryan Airlines, Inc., San Diego, California. The plane was powered by a Wright Whirlwind J-5C rated at 220 hp.

An interesting sidelight to this story is that a young man who worked on the Ryan "Spirit of St. Louis" at the San Diego factory was later to become famous in his own right; his name was Douglas Corrigan!

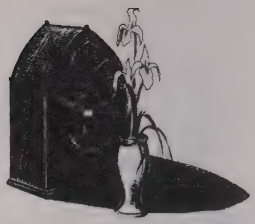
— *1934* —

It was the spring of 1934. I had just finished building a two-tube radio from plans published in an issue of *Radio News* by Hugo Gernsback. Let me describe the set for you:

(continued on page 60)

AUTHOR'S ADDRESS: 2731 HAWTHORNE RD., GLENSIDE, PA 19038-2406

Recent Radio, TV and Entertainer Obituaries



COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

CHRISTIE R. BASHAM, 68, (7-16-00) television executive. Basham was the former Executive Producer of NBC's *Meet the Press* and one of the first women to work as an executive in TV network news. She spent nineteen years with NBC's Washington Bureau, beginning in 1957 as a reporter and researcher for David Brinkley and advancing to Director of News Operations. Later Basham spent four years with CBS News as producer of morning and evening news and Northeast Bureau Manager. She returned to NBC in 1982 and held a number of executive positions including Assistant VP for NBC News in Washington. Prior to this Basham was Executive Producer of News and Public Affairs at PBS' WETA(TV) in Washington.

GORDON L. "TEX" BENEKE, 86, K0HWY (5-30-00) singer, tenor sax player and band leader. Beneke joined the Glenn Miller Orchestra in 1938 and remained with the group until Miller disbanded it to join the Army Air Force on September 27, 1942. On December 15, 1944 Miller disappeared on a plane flight over the English Channel. During WW II Beneke played with several bands before joining the Navy Band. In 1946, at the request of Miller's widow, he became the leader of the Glenn Miller Orchestra. He later broke with the Miller estate and formed his own band, billing it as "Tex Beneke and His Orchestra: Playing the Music Made Famous by Glenn Miller."

SIR ROBIN DAY, 76, (8-6-00) television talk show host. Day was known as the BBC's "grand inquisitor" for his relentless and searching interviewing technique. He hosted *Panorama*, a topical magazine, and *Question Time*, which featured a live audience and four guests from public life. Earlier Day presented *The World at 1* on radio. Day worked for the BBC from 1959 to 1989.

SIR ALEC GUINNESS, 86, (8-5-00) actor. Guinness was one of Britain's preeminent actors known for his elegance and versatility. He began his stage career in 1934 appearing in *Queer Cargo*. By the time Guinness entered the Royal Navy in 1941, he had played 34 parts in 23 plays of Shakespeare, Pinero, Chekhov, Shaw and Sheridan. Guinness made his first film appearance in *Evensong* (1934) and went on to appear in many dramatic and comedy productions concluding with *Mute Witness* (1994). He is probably best remembered for his film roles as Colonel Nicholson in *The Bridge on the River Kwai* (1957) and as Obi-Wan Kenobi in *Star Wars* (1977). Some of the recognition Guinness received included an Academy Award for his performance in *The Bridge on the River Kwai* (1957), a special Oscar in 1979 for his body of work and a Tony for his 1964 portrayal of Dylan Thomas in *Dylan*.

RICHARD HODGSON, 83, (3-4-00) business executive and engineer. Hodgson oversaw the establishment of Fairchild Semiconductor, which pioneered the semiconductor integrated circuit. After Hodgson completed graduate school in 1939, he worked as a refining engineer and during WW II as an aircraft design engineer at Lockheed. Later, he formed a television laboratory firm and licensed the Trinitron color TV monitor, one of their most important discoveries, to Sony. Hodgson later became an investor and advisor to Intel Corp. founded by Robert Noyce and Gordon Moore, who had also been employed by Fairchild.

ROBERT J. LURTSEMA, 68, (6-12-00) was the host and producer of classical music programming for WGBH(FM) in Boston. His program, *Morning Pro Musica*, began in 1971 and became an institution with as many as half a million New England and upstate New York listeners. Lurtsema was associated with the station for over 28 years.

MEREDITH MACRAE, 56, (7-14-00) actress and TV host. MacRae gained fame in the role of Billie Jo Bradley in *Petticoat Junction* on CBS Television from 1966 to 1970. From 1963 to 1965 she played the part of Sally Ann Morrison Douglas on ABC's *My Three Sons*. During the 1980s she co-hosted *Mid-Morning L.A.* on KHJ(TV) which won her a local Emmy in 1986.

MacRae began her career at age 7 when she appeared with Gordon MacRae, her father, and Doris Day in the 1953 film *By the Light of the Silvery Moon*.

ROBERT MCFARLAND, 62, (7-25-00) broadcast journalist. McFarland began his career with NBC News in 1966 as a reporter at their Cleveland Bureau and quickly became a broadcast producer. He moved to Washington in 1969 to work on the Huntley-Brinkley Report as Domestic Producer and in 1973 was appointed NBC's London Bureau Chief. McFarland returned to Washington in 1977 as Senior Broadcast News Producer of NBC Nightly News and in 1982 was named Vice President and Washington Bureau Chief. From 1990 until his retirement in 1994 he was a principal planning executive at NBC's headquarters in New York City.

NANCY MARCHAND, 71, (6-18-00) actress. Marchand gained national fame in the 1970s as Margaret Pynchon on CBS' *Lou Grant* television show and more recently in the role of Livia Soprano, the matriarch on HBO's *The Sopranos*. She also appeared on other TV shows, telefilms and miniseries. Some of her stage credits include *White Lies, Black Comedy, The Cocktail Hour* and *The Balcony*. A sampling of her film credits includes *Bachelor Party* (1957), *The Hospital* (1971), and *Dear God* (1996). Marchand won four Emmy awards for her 1979-1982 performances on *Lou Grant* and another nomination for her role on *The Sopranos*.

S. CARL MARK, 86, (7-4-00) early radio broadcaster. Mark hosted such programs as *Mutual Goes Calling* from WHK in Cleveland from 1937 to 1943. He bought WTTM in Trenton, NJ in 1948, but left radio in 1952. In 1962 Mark purchased KAKC(AM) in Tulsa, OK and in 1964 established the city's first FM station, KAKC(FM). In 1979 he renamed the classical music station KBEZ(FM).

WALTER MATTHAU, 79, (7-1-00) actor. Matthau is probably best known for his performance of Oscar Madison opposite Jack Lemmon in the movie *The Odd Couple* (1968). He appeared in over sixty films beginning with *The Kentuckian* (1955) and ending with *Hanging Up* (2000). Other highlights of Matthau's film career include *Charade* (1963), *The Fortune Cookie* (1966) *Plaza Suite* (1971), *California Suite* (1978), *The Survivors* (1983) and *Grumpy Old Men* (1993). Over the years Matthau appeared on many TV shows including *Campbell Soundstage, Danger, The Dupont Show of the Week, Goodyear Television Playhouse* and *Philco Television Playhouse*. He made his first Broadway stage appearance in *Anne of the Thousand Days* in 1949.

LOUIS QUILICO, 75, (7-14-00) Canadian baritone. Quilico sang with most of the important opera companies in Europe and North America. At home, he appeared regularly with the Canadian Opera Company and with the Opera du Quebec. He received numerous awards including the prestigious Metropolitan Opera Auditions of the Air and the Governor General's Performing Arts Award.

BOB ROTH, age unknown, (5-17-00) the host of *The Street of Dreams* heard on WPEN in Philadelphia. In 1991 the program, consisting of Big Band music and excerpts from radio shows, marked its l0th anniversary on the station. He began his broadcasting career in 1966 at WBUX in Doylestown, PA.

CRAIG STEVENS, 81, (5-10-00) actor. Stevens played the part of Peter Gunn on the TV series of the same name. The detective drama aired on NBC from 1958 to 1960 and on ABC from 1960 to 1961. Other TV credits include guest appearances on *Dallas* and *Man of the World*. During the 1940s and 1950s Stevens appeared in such films as *Humoresque, Since You Went Away* and *Night Unto Night*. On the Broadway stage he appeared in *Here's Love, Mary, Mary* and *The Owl and the Pussycat*.

SYBIL TRENT, 73, (6-5-00) early radio actress. Trent joined the cast of CBS' *Let's Pretend* in 1935 and remained with the children's program until it ended in 1954. She also had lead roles on such radio programs as *We Love and Learn, Stella Dallas, Aunt Jenny* and *David Harum*. Trent appeared in 25 short films, but later was featured in *Keep 'Em Rolling* (1934) with Walter Huston and *The People's Enemy* (1935) with Melvyn Douglas and Lila Lee. At age six she was host of *Baby Sybil Elaine and Her Kiddie Revue* on WHN in New York City.

R. LOUIS VARNEY, G5RV, 89, (6-28-00) inventor of the world-famous G5RV antenna. Varney designed the center-fed antenna with its special feeder arrangement in 1946. The antenna was capable of operation on all HF bands from 3.5 to 28 MHz. The results of his efforts to improve the multiband operation of the antenna were published in 1984. Varney was a member of the Radio Society of Great Britain for 74 years and served as a life president of the Mid-Sussex Amateur Radio Society.

LORETTA YOUNG, 87, (8-12-00) actress. Young's beauty and elaborate wardrobes made her a popular star of the 1930s and 1940s and television personality of the 1950s and 1960s. She appeared in nearly 100 films beginning with *Naughty, But Nice* in 1927 and ending with *It*

Happens Every Thursday in 1953. Some of her other film credits include *Taxi* with James Cagney (1932), *Call of the Wild* with Clark Gable (1935) and *The Bishop's Wife* with Cary Grant (1947). In 1947 she won an Oscar for her performance in *The Farmer's Daughter*. Young's television credits include *The Loretta Young Show* on NBC from 1953 to 1961 and *The New Loretta Young Show* on CBS from 1962 to 1963. Young received Emmy awards for the shows in 1954, 1956 and 1958-59.

Information for this column was obtained from *The Boston Globe*, *Broadcasting and Cable*, *The Complete Directory to Prime Time Network TV Shows 1946-Present* (4th ed.), *The Hartford Courant*, *On the Air: The Encyclopedia of Old-Time Radio*, *Practical Wire Antennas*, *The New York Times* and *Variety*.

Thanks to Dr. John M. Anderson, Frank Q. Newton, Jr., W6SYG; Edwin C. Tyrrell, Jr. and Dr. A. David Wunsch for additional source material.

RADIO AS IT USED TO BE, *continued from page 57*

It was built on a piece of wood taken from the end of an orange crate. The board was sanded smooth and given two coats of clear shellac. The radio panel was Masonite, drilled to mount the two variable condensers, a rheostat and a phone jack. The Masonite was also given two coats of clear shellac, and then followed two coats of Pratt & Lambert black enamel.

The circuit consisted of a 201A tube as a regenerative detector with plug-in coils, a 5:1 ratio audio transformer, and a second 201-A tube as the audio amplifier. Headphones were "Brandes Superior" 2000-ohm units. The 60-foot antenna of stranded copper wire ran through the window sill of my bedroom and out to a peach tree in the back yard. The ground wire ran to a water pipe in the basement.

Each day I would ride my bicycle to the local telephone office and check their trash pile for batteries. Soon I had several Eveready "Columbia" Gray Label Long Life telephone cells with Fahnestock clips. I checked them all and finally selected four "good" dry cells for use on my radio as filament batteries.

I saved my money and finally went to Harry's Auto stores (Ohio's equivalent of Pep Boys) and purchased two 45-volt Eveready "Layerbuilt" "B" batteries for the receiver ($1.95 each for the medium size).

Late in April of 1934 all batteries were connected and after reversing the tickler coil leads (a common problem), the set worked. I listened to hams on 160 meters and to stations on the standard broadcast band. I could hear WSPD Toledo, WTAM Cleveland, WWJ and WJR Detroit, and WLW Cincinnati among other popular stations of the day.

Of course, many of these early radios were regenerative receivers and to a great extent, the strength of the received signal determined the audio output in the headphones. No such thing as automatic volume control (AVC) on my receiver.

When I tuned in WLW on 700 Kilocycles (428.3 meters or 700 kHz) late in the evening, I could listen to the music of Shep Fields and his "Rippling Rhythm Orchestra" playing at the Netherland Plaza in downtown Cincinnati. (WKRP and Jennifer weren't even thought of then.)

The clear-channel station WLW ran 50 kilowatts and was heard very well at night in northern Ohio where I lived. Then came the news that WLW was going "higher power." On May 2, 1934, I listened carefully to WLW throughout the evening and at 9:02 p.m. something "really big" happened. In Washington D.C., President Franklin Delano Roosevelt signalled the WLW transmitter to apply plate voltage to the super-power 500-kilowatt unit! Imagine, 500,000 watts of output power went on the air to be radiated from a single 831-foot-high vertical antenna!

With my little two-tube receiver, I did detect a noticeable increase in audio output and no fading of received signal—but I was a little disappointed in the results. I expected more audio I guess. (dBs were unknown to me.)

WLW began to operate regularly on high power as a clear-channel super-power 500 kW AM station. Eventually WLW employed a directional antenna system after local sundown to protect a station in Ontario, Canada, and continued to operate high power until 1939 when, at the FCC's request, the station reverted to 50 kilowatts.

BY BERNARD MAGERS

THE SCR-68 AND ITS VACUUM TUBES

When Lee deForest inserted a grid into a two-element tube in 1907, thus creating the first triode, he invented a device that would soon become as important as the steam engine, the dynamo, and the telephone. The "Audion," as it was first called, developed into a full grown and powerful instrument by 1914. By 1917, the triode vacuum tube was beginning to be used in light weight, rugged, aircraft radio telephones.

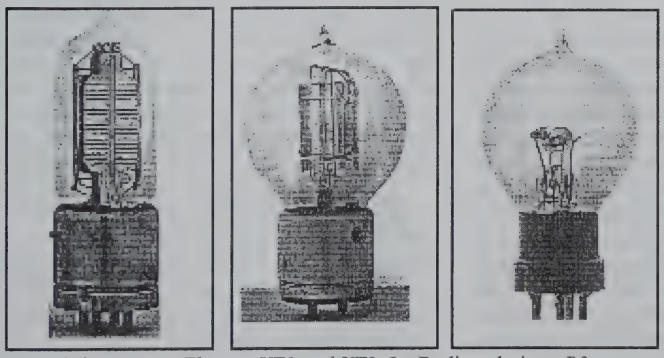
Dr. deForest had pioneered in the development of two-way ground-to-air radio telephones for military aircraft prior to World War I. His work eventually led to the Signal Corps set type SCR-68 utilizing the VT-1 and VT-2 vacuum tubes. deForest was assisted by Charles Willard, a protege and student pilot of Glenn Curtiss.

Willard had the distinction of being the first pilot to be shot down. It happened in a field near Joplin, MO, when an angry farmer fired a rifle bullet, shattering a propeller blade and sending Willard's plane vibrating to the ground with a thud. He walked away, later becoming chief engineer for the Glenn Martin Co. before returning once more to Curtiss.

World War I was on the horizon and soon many more pilots would be shot down. Air armament developed rapidly during the war. Aviators from opposing sides who waved at each other in the beginning started shooting pistols, rifles, and then engine-synchronized machine guns. Engine horsepower went from 90 to 220 to 400. Air speed increased from 75 to 150 mph.

American volunteer pilots, were trained in the Curtiss JN-4 "Jenny," a ship which floated gracefully and practically landed itself. Some JN-4s, for various reasons, were equipped the SCR-68. Primary considerations in the design of the SCR-68 were (a) minimum weight and (b) construction rugged enough to resist engine and wind vibrations. Tube sockets were mounted on sponge rubber cushions and the entire cabinet was mounted on shock absorbers.

The danger posed by an open spark was extremely great. The dope-painted, linen-covered wings and fuselage were highly inflammable and the hazard was increased by the likelihood of gasoline vapors in the cockpit. Insulated wires were securely attached to struts. Spark gaps were closed or covered with gauze. The SCR-68 set, which was made by Western Electric, contained one ballast lamp, two VT-2s, and three VT-ls. The ballast lamp, similar to a WE 48, controlled the filament current when voltage varied. Two VT-2s were surrounded by a coil to save space. One was used as an oscillator and one as a modulator. One VT-1 was used as a detector and two as amplifiers. Colpitts oscillator and-Heising modulator circuits were used.



From left: Western Electric VT1 and VT2; La Radiotechnique *R3.*

The VT-1 (originally WE type J) went through five stages of development before the final ruggedized version was adopted. The heavy brass

AUTHOR'S ADDRESS: 607 SW WILLIAM, LEE'S SUMMIT, MO 64081-2643

base was replaced with light sheet metal; the glass arbor was eliminated as being too weak; and the plate was changed to stamped corrugated sheet metal which fit around the stem and was clamped at the top with a block of Lavite.

The conventional notched and peened grid, using siderod and lateral wire, was replaced with stamped sheet steel supported by lead-in wires at the bottom and by wires imbedded in the lavite. The grid was 1.6" long with 15 spacings 0.10 inches apart. The block also held a tungsten spring wire hook for filament support. The V-formed filament was made of barium-oxide-covered platinum and gave good emission at dull red heat. The entire construction was very rugged and vibrationless, which reduced AF noise and microphonics.

Four studs in the base were contacts for grid, plate, and the filament circuit. A special socket with spring contacts was used. The VT-1 was 4 ⅜" long × 1¼" in diameter. An identical version for the Navy was designated CW-936. The VT-2 was similar in construction but had a globular bulb.

The following chart compares the characteristics of The VT-1 and VT-2 tubes with some of those of the R3, a triode heavily used by the French military (manufactured by *La Radiotechnique*).

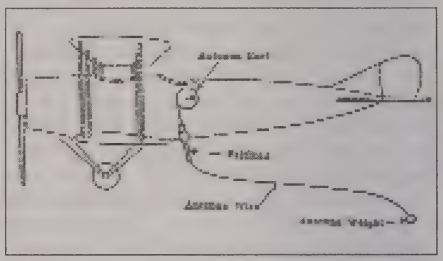
	VT-1	VT-2	R3
Filament Voltage (E_f)	2.5 V	7 V	5 V
Filament Current (I_f)	1.1 A	1.35 A	1.2 A
Avg. Plate Voltage (E_b)	30 V	250-400	200-400
Amplification Factor (μ)	6	7	10
Plate Resistance (r_p)	15 kΩ	5 kΩ	24 kΩ
Avg. Plate Current (I_b)	1 mA	40 mA	
Mutual Conductance (g_m)	450 μmho	2000 μmho	

The set operated on a battery and charger to maintain uniform voltage. A generator enclosed in a streamline casing was mounted on the landing gear struts in the airstream. The wind rotated a variable pitch fan for constant charging.

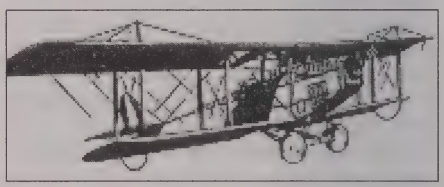
The antenna was a 300-foot length of #18 bare copper wire mounted to a reel on the side of the fuselage. The wire could be let out or taken in as needed. The trailing end was weighted by a 3 lb. weight called a "fish."

The wire was led out of the plane through a "fairlead" mounted on the floor. This contained a tubing that made continual electrical contact with the wire, which slid freely through it and was easily reeled in when landing. The counterpoise was made up of metallic parts of the aircraft carefully bonded together.

Interior of SCR68 radio telephone. It's a poor picture, but you can still make out (from left) the ballast lamp, the two VT-2s inside a coil, and the three VT-1s.



Trailing antenna installation in an early aircraft.



The Curtiss JN-4 "Jenny."

The length of the antenna wire depended on the wavelength of the signals. In the Curtiss JN-4, the natural wave length in meters was approximately equal to the length in feet of the trailing antenna. The directional properties required the aircraft to fly toward the communication point for loudest signals. Tuning had to be changed when flight direction changed.

REFERENCES

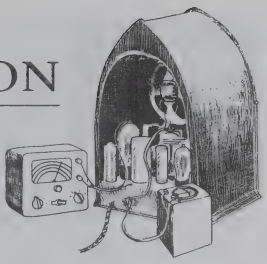
Radio Engineering Principles, Laur & Brown, McGraw Hill, 1920.

Thermionic Vacuum Tube, Van Der Bilj, McGraw Hill, 1920.

Flight, Boyne, Smithsonian Books, 1987

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
PLEASE SEND CORRESPONDENCE DIRECTLY TO THE ABOVE ADDRESS, INCLUDING SASE FOR REPLY.



Switch Repair Lore

Frank Lotito's appeal for increased reader participation in this column (May, 2000 "Letters to the Editor") has brought several responses. You'll recall he suggested that those with experience in the tricky area of wafer switch repair might like to share their knowledge.

Immediately following the appeal, there was a detailed article on switch repair by Daniel Schoo in *Antique Radio Classified*, V. 17, #7 (July 2000). There is also a short article on the subject in *The OTB*, V. 27, #4, p. 37, by Richard Brown. With these two articles in hand you should be able to solve most switch repair problems.

♦ ♦ ♦ ♦

Additional information comes from Al Pugliese (Staten Island, NY) who is in the business of restoring Fisher Hi-Fi gear. He uses an epoxy cement called JB Weld to mend broken wafers. It is available in auto parts stores. Al rubs the cement into the fibers of the broken edges. He uses a minimal amount so it won't ooze out and form a bead at the joint. He then clamps the broken wafer together with miniature "C" clamps under gentle pressure for 24 hours. So far he says this method has worked perfectly.

Al uses De-Oxit D-5 for cleaning contacts. This product is made by Caig Chemical Co. and comes in an aerosol can or as a concentrate in an oiler-type bottle. Al uses it for almost everything. On very noisy switches, he wets a swab with De-Oxit and rubs the contacts. It is good for pots and will free stuck shafts. He applies the concentrate to noisy variable capacitor wipers.

Al says that these products have never harmed panel lettering or dial glasses.

♦ ♦ ♦ ♦

For badly tarnished or corroded contacts, your editor has used the following method for years. First, I clean the contacts with any commercial degreasing aerosol. Then I apply a liquid tarnish remover carefully to the contacts with a medicine dropper. Tarnish removers are readily available in department stores for dipping silverware to "polish" it.

The contacts are then flushed thoroughly with water, the last rinse being distilled water. After air drying for a day or so, the set can be fired up. I don't use any protective lubricants because I've found that they cause more trouble than they cure.

Pots are another matter. Many old pots don't use a wiping contact. Instead, a metal band or plate is pressed against the resistive element as the contact. Any oil or grease on the band or element causes noisy operation. I have found that only a true degreaser-cleaner leaving no residue works on these pots.

♦ ♦ ♦ ♦

Harry Blocker, W6QKS has used WD-40 on switches for years with good results. He also says it works well on pots.

About Our Feature Article Authors

PAUL BOHLANDER, W3VVS
Radio as it Used to Be

Paul graduated from Dodge Radio and Television Institute, in Radio Engineering, just before the war. In 1941-42, he served as an engineer for station WMRN in Marion, Ohio. In 1942 he returned to Dodge as a code and theory instructor for the 1503 Signal Corps Training Unit—sometimes sending practice code to his classes for 8 hours a day.

Paul joined Philco as a Field Engineer in 1943—but was almost immediately contracted out to the navy Bureau of Aeronautics as a radar instructor (operation and maintenance). Later, in this role, still as a civilian noncombatant, he served with a marine squadron in the South Pacific.

After the war, Paul continued with Philco, then with Philco-Ford, then with Philco-Aeroneutron, as a Senior Technical Writer, working primarily on manuals for military

(continued on page 65)

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of $15.00 and it will seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for $50.00 and save $10.00 over the individual ad pricing.

Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA) to Robert W. Perry, "Smoke Signals," 131 E. High St., Painted Post, NY 14870. Closing date is six weeks prior to first day of month of issue. **All advertising income is used to further the conservation work of the AWA Electronic Communication Museum.**

ANTIQUE TUBES WANTED
We buy and sell Collector and Pre-Octal Tubes
See www.fathauer.com for listing or
for catalog e-mail fathauer@home.com or call
George H. Fathauer & Assoc.,LLC
688 W. First St., Ste. 4, Tempe, AZ 85281
Phone: 480.968.7686 Fax: 480.921.9957

TUNE IN
ANTIQUE RADIO REPAIR
TOTAL RESTORATION
Bob Heiman
801 Maple St., Atlantic, IA 50022
Phone (712) 243 - 2572

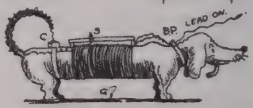
Early Radio & Collector Tubes
BUY,SELL,TRADE
Call, write or e-mail for catalog or list
GEORGE H. FATHAUER & ASSOC., LLC
688 W. First St. Ste 4, Tempe, AZ 85281
Phone: 480/968-7686 Email: fathauer@home.com
Fax: 480/921-9957 URL: http://www.fathauer.com

WANTED!
WW-2 JAPANESE MILITARY RADIO
Takashi Doi
1-21-4, Minamidai, Seyaku, Yokohama, 246
Japan
Email: takadoi@carrot.ocn.ne.jp
Fax: 011-8145-301-8069

Wireless Telegraphy Telephony Radio Television Electricity
Used Books/Literature Bought/Sold
Old Authors Bookshop
PO Box 403 Morrisburg, ON Canada K0C 1X0
Tel: (613) 543-3337 Fax (613) 543-2380
authors@mor-net.on.ca
Http://www.abebooks.com/home/oldauthors

RADIO DAZE
MAIN OFFICES & RETAIL STORE
7 Assembly Drive, Mendon, NY 14506
Tel: 716-624-9755 Fax: 716-624-7857
Our Website: www.radiodaze.com
VINTAGE RADIO & ELECTRONICS
Sales - Service
Components - Supplies
Information - Literature
email: info@radiodaze.com
Radio Daze, LLC - A Limited Liability Company

Bob's Antique Radios
Buy-Sell-Trade
Quality Capacitors and Electrolytics at fair prices
For more Information visit
Radioantiques .com or Email
radiobob1@ aol.com

The Xtal Set Society
Crystal Set books-plans-parts


www.midnightscience.com
call Rebecca 1-800-927-1771

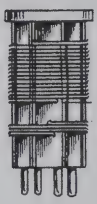
ANTIQUE RADIO STORE
www.oldradiosrus.com
8280 Clairemont Mesa Blvd. Suite 114
San Diego, CA
Phone/FAX 858-268-4155
Buy, Sell, Service, Restore
Owners: Jack Hofeld, Jeff Stevko
Mailing Address: 7420 Clairemont Mesa Blvd #103-531
San Diego, CA 92111
E-mail: antrad@juno.com

All Tube Equipment Repaired
"The Fisher Doctor"
VINTAGE FISHER PRODUCTS
Bought • Sold • Traded • Repaired
Al Pugliese
718-948-7489
FisherDoc@aol.com
27 Daleham Street
Staten Island, NY 10308

SOUTH BAY RADIO
SINCE 1955
Repairs to vintage tube equipment including home receivers, phonographs and auto radios
Leonard Aquilino, Jr.
(315) 699-7341
7187 Lakeshore Rd.
Cicero, N.Y. 13039

VACUUM TUBES!
• Svetlana amateur & transmitting tubes
• Over 3000 types of NOS tubes
• Parts • Supplies • Books
Write, call or e-mail for our free catalog
Antique Electronic Supply
6221 S Maple Ave • Tempe, AZ 85283
Phone (602)820-5411• Fax (800)706-6789 or (602)820-4643
www.tubesandmorecom • E-mail: info@tubesandmore.com

Tel (856) 869-0238
Fax (856) 869-6880
SOUND REMEDY
Loudspeaker Repair Service
Richard G. Stamer
Reliable-Prompt-Guaranteed
331 Virginia Avenue
Collingswood, NJ 08108


Highest quality how-to books!
Brand new & reprints of classics. Early radio, electronics, electricity, machines, science & tech! Projects, plans, nuts & bolts. Big Catalog!
http://www.lindsaybks.com
Lindsay Publications
PO Box 538 Bradley IL 60915

Books For Radio Collectors
Museum of Radio and Technology
Museum Bookstore
4204 Thorn Apple Lane
Charlestown, WV 25313

Radio Activity
Old radios repaired and purchased
Wanted Zenith consoles
Repairs guaranteed
Jim Berg (509) 732-4047
4261 Wilcox Rd. Box A Northport, WA 99157
jimfberg@webtv.net
http://homepage.plix.com/Radioactivity

ABOUT OUR AUTHORS, *continued from page 63*

equipment. He retired about 1975, but for several years continued developing technical publications on a freelance basis for several major corporations.

WILLIAM B. FIZETTE
A Structured Approach to Fixing Up Those Nice Old Radios

Bill is AWA's current president as well as Editor of *The OTB's* "The Communications Receiver" Column. His bio appears in the February, 2000 issue.

DR. HUGO HOLDEN
Grid Leak Detection in the 1920s—Part 2.

Dr. Holden's "bio" is not available at this time. It will be included in the February, 2001 issue, when we run Part 2 of his article.

BERNARD MAGERS
The SCR-68 and its Vacuum Tubes

A retired production engineer for Western Electric, Bernard Magers worked for 38 years in the vacuum tube manufacturing industry. Mr. Magers is the author of *75 Years of Western Electric Tube Manufacturing* and holds a patent in tube construction. He attended the University of Minnesota, served in the navy during World War II, and is a licensed pilot.

LUDWELL SIBLEY
Tube Lore: "Make vs. Buy" at RCA—Part 2

Lud's bio appears in the previous (August, 2000) issue.

PETER SYPHER, KC4SI
Explosive Charges Fell NSS Antenna Farm

Peter Sypher retired in 1997 from a career in electronics and system engineering. He has bachelor's and master's degrees in electrical engineering and an Advanced Class amateur radio license. He works part time as an information technology consultant and experiments with HF antennas.

First licensed as WN3UTK in 1952, he oper-

(continued on page 69)

NEW BOOKS AND LITERATURE

EDITED BY **WILLIAM E. DENK, W3IGU**, 81 STEEPLECHASE RD., DEVON, PA 19333-1226
PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to Bill Denk at the address above. After review, all such books become a permanent part of The AWA Library, which is part of The AWA Electronic Communication Museum and is available to members for browsing and research.

The Complete Price Guide To Antique Radios: Pre-War Consoles

By Mark V. Stein. Published by Radiomania Books, 2109 Carterdale Road, Baltimore, Maryland, 21209, Tel. 410-366-3993. 8½ by 11 inches, 235 pages, soft cover. $29.95 postpaid. Radiomania Website: www.radiomania.com.

The author concedes, in a foreword, that far fewer consoles than table models have survived in antique radio collections for reasons of size and transportability. Yet, a review of this book will convince the reader that many of the cabinet sshow signs of real artistry.

This reviewer has not one console in his collection. One that passed through it, a Philco Model 95 in a "Highboy DeLuxe" cabinet, was sold in 1990 to the Atwater Kent Museum in Philadelphia. Another, given to me in the 1980s and in poor condition, met a sad fate. I removed the chassis and loudspeaker, took the cabinets out on the driveway and, with an axe, reduced it to kindling for the fireplace. As the author observes, it is really a matter of space.

The preceding paragraph notwithstanding, the pictorial "Price Guide" will fit well in our libraries. Even those who cannot find space for consoles could easily find space for this book. Some consoles were pretty ordinary looking, but others showed design genius.

While there is an informative ten-page foreword, this is essentially a picture book, with twelve excellent pictures of console radios per page. There are 219 such pages, for a total of 2628 consoles, ranging from seven models for ACE (1936 and 1937) to three models for ZEPHYR (1938). CROSLEY is represented by one hundred and eleven! And PHILCO by one hundred and forty six!

In the Atwater Kent section, I may have found one missing; that was a truly ugly metal (!) cabinet console. I saw it in a friend's collection. Perhaps (and hopefully), it was not widely sold. In contrast to this one model, some of the Philco models were designed by the noted industrial designer, Norman Bel Geddes. One example is the Philco model 112 Lowboy, circa 1931, illustrated on page 130 of the book. This "Complete Guide..." is indeed complete, and well worth the price.

♦ ♦ ♦ ♦

Tube Testers and Classic Electronic Test Gear

By Alan Douglas. Published by Sonoran Publishing, LLC, Chandler, Arizona 85226, Tel. (480) 961-5176. 166 pages, 8½ by 11 inches, softcover. $25.95. Available from book dealers and the publisher.

As one would expect from such a highly regarded author, this book beautifully fills a real void in the literature dealing with pre-1970 radio test equipment—a field of special interest to AWA members and to collectors of the history and gear of early radio generally.

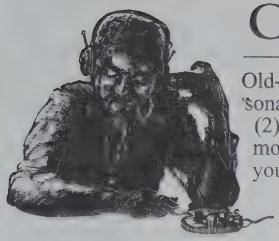
In the area of tube testers, Alan provides a 19-page "Introduction," in which he reviews such topics as emission tests, amplification tests, the measurement of mutual conductance, the Hickok circuit, static grid shift, calibration of Hickok and Cardmatic models, gas testing, leakage and more. Nine pages are devoted to curve tracers and curve tracing.

Following the introduction, 100 pages are devoted to the products of 29 different manufacturers of tube testers, including such names as General Radio, Hickok, RCA. Sylvania and Weston. The Hickok section alone (5 pages) is illustrated with numerous good photographs of Hickok products, including the reproduction of a full page ad featuring the then new Model 123A tube tester.

Part II, 28 pages, is directed to "Component Measurements," and has sections covering Volt-Ohm Meters (including the ubiquitous Simpson 260) as well as Set Analyzers produced by Weston, Supreme,Triplett and others. Also included here are several interesting pages directed to the origin and construction of the D'Arsonval meter.

Part II also contains a section on vacuum tube voltmeters, including references to products of RCA, Rider, Hickok, Ballantine, Amperex and General Radio. There is a separate section on Q Meters including those of Boonton, Triumph and

(continued on page 68)



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include as SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551**.

IMPORTANT!

OTB classified ads are now available for browsing in the "*OTB On Line Edition*" on our internet web site (www.antiquewireless.org). This practice will give members dramatically increased exposure for their ads.

SELL/TRADE—BC/SW TUBE RADIOS

1958 Philips, B5E 83A, repairable, $130.; 1950s Tungsram, T-1552,, $130.; 1950s Philips, B3X 36A/00C, good cond., $130.; 1960s Kolster, Surprise Party, repairable, pick-up, $83.; WW II Belmont Radio Corp., R-45/ARR-7, repairable, $183.; 1950s His Master's Voice, 5127, nice, gd. cond., 6 band, $212.; 1940s Olympic Radio, LP-213 294, repairable, $70.; 1950s Luxor, Luxorita 355 LB, repairable, Sweden made, $130.; 1950s DeWald, far west, repairable, transistor, Spain made, $83.; 1960s Erres, gd. cond., transistor, Holland made, $65.; 1960s President, TR-1030, repairable, transistor, Japan, $73.; 1960s Philips first pocket cassette, EL-3302A/ooG, repairable, transistor, Holland made, $65. Jose Antonio Jimenez Sarmiento, Camping Guantanamo, S/N Tauro-Mogan 35138, Las Palmas de Gran Canaria, Spain

SELL/TRADE—GENERAL

Heavy turntables. Fairchild 311, 312, etc. in various configurations by former employee. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523

Trade from following, +/- cash, for original 1935 Model 835 chrome-front tombstone; Emerson BT 245 catalin, butterscotch/maroon, no cracks, original cardboard back, AK homebrew breadboard, style 3945, probably 1922, pre- factory assembled, ARIA catalin, butterscotch/orange (identical to Dewald 561), bottom cracks, has back, has back, /Detrola 4D1 mini-cathedral, Philco 90 lo-boy console, AK84 cathedral (near mint), Grunow 1291 Teledial, Zenith 12A58 chassis, speakers, parts, Emerson 414 "Wheat" repwood, Zenith 8S463 (mint), Scott 16 chassis (2), pitted, w/o speaker. Thanks. Chris Hicks, 57 Jameson Hill Road, Clinton Corners, NY 12514 (eves/week-ends)

Andrea VK12 television-radio console, about 1950, operates fairly well with rabbit ears, needs minor work. One dial for TV (1-13) and FM, including police band, second dial for AM. Has 28 tubes, plus spares. Nice original cabinet, 40" high, 26" wide. Offers welcome. Doug Eldridge, 125 Dodd St., East Orange, NH 07017 (973) 684-8194

Beautiful Stromberg-Carlson TS-16-10M large early TV/radio/phono. I must move and will consider any offers. Am also thinning my rather large collection of table models, consoles, military radios and phonos. List available. Malcolm Burdick, W1NOD, 156 Station Road, Hampton, CT 06247 (860) 455-9640 before 8:30 P.M.

SELL/TRADE—LITERATURE

Collins 75A-1, 75A-2, 51A-4, KWM-1, KWS-1, 30L-1, 75S-1, 32V, 32V-2, 32V-3 Johnson Ranger, Valiant, Challenger, Navigator, Viking II, Courier; National HRO-5A1, HRO-7, HRO-50, HRO-60, NC-183C, NC-200, SW-54. A. J. Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (407) 351-5536

Original 1890s Western Union blank telegraph forms with attached receipts. Have limited supply, $6. each, postpaid. Herman Fothe, 5292 Tiffany Anne. West Palm Beach, FL 33417 (561) 688-2794

Radio schematics & service data - U. S., Canadian & Australian receivers. Cost $ 2.50 plus a # 10 SASE This is for 1 to 5 pages of data per model. Over 5 pages, copy charge is 20 cents per page. Questions/quotes E-mail or SASE Steve Rosenfield, P. O. Box 418, Manahawkin, NH 08050 Ph. (609) 597-2201 E-mail: srosenfeld@ems.att.com

Collection of AWA OTBs 1974-1999. All mint with 1 index and monographs. $110. Includes shipping. Richard Cane, 1333 N. W. 127 Dr., Sunrise, FL 33323 (954) 846-7116 E-mail: rbcane@sprynet.com

1935 British patents, abridgments of specifications, 400,001 to 420,000, wireless thermionic valves, telegraphs, television and arc lamps. This is a paperback in fair condition, $ 75. plus shipping. Edward Hlas, 47 Westview Ave., Hubbard, OH 44425

Canadian Antique Radio Schematics - Do you need a schematic for a 1924-1967 Canadian made tube radio? If so, please advise of make, model and approximate age. $5. per schematic. Dave Cantelon, 42 Clematis Road, North York, Ontario, Canada M2J 4X2 E-mail: justradios@yahoo.com

Cavalcade of broadcasting, 254 page historical picture book of early radio and TV, $ 35.; From Semaphore to Sattelite, $ 30.; Rockola jukebox shop manual, $ 20.; Instructions and diagrams for Tech-Master kit TV, $ 15.; Large TV shop manuals on Emerson, Westinghouse, Dumont, GE, Stromberg-Carlson, 1946-1954, $ 10. each.; 10" x 13" TV magnifier, $ 20.; Admiral TV-Radio store window decal, large, unused, $ 25.; Electrostatic CRTs, 12 assorted for $ 85. Bill Rolf, 30131 Center Ridge, Westlake, OH 44145 (440) 871-4547

WANTED—COMMUNICATIONS GEAR

National NTE Exciter, S-101, HRO speaker. I love National. Sylvia Thompson, N1VJ, 33 Lawton Foster Rd., S. Hopkington, RI 02833 (401) 377-4912

WANTED—GENERAL

Western Electric speaker, loudspeaking telephone, driver/receiver, horn, amp: 25B or 25C, their manuals or parts. Acrosound TO-350 or TO-355. Ming Yang, 1995 University Avenue, #119, Berkeley, CA 94704 (925) 376-4220 E-mail: yang1240@aol.com

Want a stock ticker machine, and associated tape. Charles Harper, 2000 Jackstown Road, Paris, KY 40361 (859) 484-9393 E-mail: charper@kyk.net

Coil winding machine such as Morris or equivalent. Al Kaiser, W3LEQ, 713 Marlowe Road, Cherry Hill, NJ 08003-1551 (856) 424-5387

WANTED—INFORMATION

Anyone who can supply information on a Lorenz T-22 Recorderphone. It came overseas with a now elderly lady from Switzerland. Her daughter thinks it is German. It is a wire recorder, playback, with several bands of radio. Would appreciate any info including schematics, instruction manuals (reprints OK) or any leads where I might obtain such info. Allan Deeg, Box 73, Admiral, Saskatchewan, Canada S0N 0B0 (306) 297-3014

WANTED—KEY & TELEGRAPH

Unusual telegraph gear such as oddball bugs from obscure manufacturers, large spark era keys especially oil keys, and pre 1870 landline keys, sounders or registers etc. Always looking to add to my 35 year collection of telegraph gear. Gil Schlehman, K9WDY, 335 Indianapolis, Downers Grove, IL 60515

BOOK REVIEWS, *continued from page 66*

Heath. An additional illustrated, two-page section describes the Boonton Radio Corporation, its origin, purpose and products.

Other sections cover Grid Dip Meters, Capacitance and Inductance Bridges, Signal Measurements, Signal Generators, Signal Tracers and Oscilloscopes—all profusely illustrated. In this new book, author Douglas does a great job, covering his subject exceedingly well, with several hundred well selected photographs.

♦ ♦ ♦ ♦

History of Telecommunications Technology—An Annotated Bibliography

By Christopher H. Sterling and George Shires. Published 2000 by Scarecrow Press, Inc., 4720 Boston Way, Lanham, Maryland 20706, (800) 462-6420; 336 pages, 5½ by 8¾ inches, hardcover. Price, $65.00.

Here is one of the best bibliographic references you'll ever find! Featuring more than 2500 annotated entries that trace the history of major telecommunications technologies over the past 175 years, it is more than just a list. These technologies are broken down into a dozen easily searched areas such as "Telegraphy," "Telephony," "Radio," "Television," and the like.

Chapter 9, on "Radio," is broken into a dozen sections such as "Contemporary Works on Wireless (1892-1908)," "Wireless and Radio (1909-1935)," and "Survey Histories"—which includes references to all 12 volumes of the "AWA Review," "Radio and Broadcasting after 1925," "Circuits and Patents," and "Vintage Radios."

A typical entry in "Wireless and Radio (1909-1925)" reads "9-045 Alexanderson, E.F.W. 'Trans-Oceanic Radio Communication.' *Proceedings of the IRE*, 8: 263-285 (1920). The G.E. engineer describes his alternator in design and application."

This very useful bibliography is a really valuable contribution to an area of history that is of major interest to AWA members.

WANTED—LITERATURE

Radio News January 1944; Radio-Craft August 1942 and January & May 1940; 1963 WRL catalog; instruction manuals for Heathkit Apache (TX-1), FMO-1, IM-12, TC-3, Ameco TX-86; National NC-303, NC-188, NC-140; Hallicrafters SR-75; Lafayette HA-225, HA-226, HA-230; Collins 75A-3. A. J. Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (404) 351-5536 E-mail: ni4q@juno.com

Need operation & construction manual and tube/transistor testing charts & books for EICO 666/667; construction manual for EICO 232 VTVM AC/DC/ohms probe. Receivers BC348NQ, R392; Simpson operation and maintenance manual for Simpson 260 VOM. Alan Mark, P.O. Box 372, Pembroke, MA 02359

Need schematics and service data for the following equipment: RCA 10X "Little Nipper", RCA 5Q22, RCA 125, RCA 61-X-1 "Radiola", RCA 5Q2, Zenith T-522-W, Belmont Radio Corp. R-45/ARR7, Olympic LP-213, Philco 3402, Philco A3627U Tropic, G.E.C. BC-4972 L, Columbia Electronics AN/SGC 1A, Mamaroneck VOX 5, Mamaroneck TIS 3A. Jose Antonio Jimenez Sarmiento, Camping Guantanamo, S/N, Tauro-Mogan 35138, Las Palmas de Gran Canaria, Spain

Manual or schematic for RBL-2 Navy shipboard VLF (15 to 600 kHz) receiver circa mid 1940s. Edwin Rybak, W3QAG, P.O. Box 753, Morrisville, VT 05661-0753

WANTED—MILITARY

Still looking for a Russian, an Italian and a French set to complete my collection of WW II receivers (one from each country involved in WW II). I can trade a German Torn Eb, BC 348, BC 348, BC 342, BC 312 or a DAK-3. Also looking for a TBX set. Charles Newcomer, 100 Central Manor Road, Mountville, PA 17554

WANTED—PARTS

Bakelite dials, 3" O. D., also antique binding posts. Len Gardner, 458 Two Mile Creek Rd., Tonawanda, NY 14150

Looking for parts for a solid state Sams 602-4 and an Arvin Model 61R58. Also cords for two headphones. James Maloney, 1703 Leno Road, Macedon, NY 14502

Speaker for National HRO, restored or unrestored; parts for Hallicrafters, SX-42, including cabinet, knobs and S-meter glass. Also want horn speakers and knobs for 1930s, 1940s and 1950s radios. Jose Antonio Jimenez Sarmiento, Camping Guantanamo, S/N Tauro-Moran 35138, Las Palmas de Gran Canaria, Islas Canarias, Spain

Need Grebe CR-9 cabinet, two audio transformers and one filament rheostat to complete restoration. Charles Mooney, N3RQY, 13018 Midsummer Lane, Bowie, MD 207715 (301) 464-1624 E-mail: charlesmooney@ webtv.net

WANTED—TEST GEAR

Milliameters manufactured by the Universal Scientific Company, Vincennes, Indiana. Have for sale antique receiving tubes and 1930s and 1940s transmitting tubes. SASE for list and prices. Parker Heinemann, W1YG, 87 Cove Road, Lyme, CT 06371

WANTED—TUBE RADIOS

Arvin 517 tombstone chassis. Restorable tombstones. Please write with price. Patrick Franzis, 235 Millville Ave., Naugatuck, CT 06770

ABOUT OUR AUTHORS, *continued from page 65*

ates on the HF and VHF bands. Peter is an officer of the Vienna Wireless Society of Vienna, Virginia and is also an officer of the Northern Virginia Section of the IEEE. An AWA member since 1985, he collects vacuum tubes and books on spark telegraphy.

WILLIAM L. TIPTON, JR, K5JRI
70.7 Volt Transformers for Output Applications

Bill's interest in antique radio restoration began at age 14 with the acquisition of a Zenith 8S463 console. He still has the set, along with his original amateur radio equipment, purchased a year earlier. He worked as an electronics technician until 1990, when corporate downsizing forced him to retrain and become a classroom teacher for Duval County Public Schools.

Graduate work at the University of North Florida led to a Master of Business Administration in 1989 and a Master of Education in 1995. Bill is currently working on a dissertation to complete the requirements for a doctorate in Educational Leadership.

Several of his contributions have been published in *Antique Radio Classified* and *The OTB*. The "Hints and Kinks" section of the September 2000 issue of *QST* contains his article, "Sweep Tube Replacements."

MUSEUM, continued from page 72

manent Museum Charter application process. Our new lawyer has altered the direction we were taking and this requires reorganizing the museum and rewriting the bylaws. This will be a busy Fall.

However, one task has been made much, much simpler. I may have mentioned that I receive two or three e-mails a week from folks visiting the museum Web page and then writing to ask a question. Answers are usually found in an AWA *Old Timers Bulletin* or a *Review*, but the research time has been bothersome. Not now! The AWA, in this issue, is announcing some glorious research tools to find any content within any AWA publication. Available are paper indexes of the *OTB*s and *Reviews* as well as the same indexes, in searchable form, on a 3.5 inch floppy disc. (See inside back cover).

The ultimate tool is the new AWA CD-ROM which contains a library full of *OTB*s on two CDs. Merely search the CD's index and then click on the *OTB* volume, type in the page number, and there it is! The scans are very well done and are clearly legible and printable. This has really made the vast amount of radio history, contained within 40 years of AWA publications, a premier research tool. Ordering information elsewhere in this issue.

New Research Tool!

Index of *The OTB*, *The AWA Review*, and other AWA documents from beginning of publication through March, 2000. Available on either paper or 3.5-inch floppy disc (text format, searchable with your word processor). Introductory price: $9.00 postpaid for either version ($7.00 with any purchase of $19.00 or more from following page). Limited quantities—order today!

As you read this, your museum will be winding down for the season. I would be very glad to hear from any of you regarding ideas for new displays or methods on improving existing ones. I am especially interested in ideas for interactive displays. Hope to hear you in the AWA on-the-air events coming up. Have a nice Holiday season. S'long from your museum crew.

Ed Gable

Ed Gable K2MP/W2AN
Curator/Director, AWA Museum

RECENT MUSEUM DONORS

Bill Coleman	Taylor T-55 NIB
Dick Frew	Magnavox horn, CW keys, Ham TX
Dave Gardner	large collection of Ken Gardner (W2BGN)
Helen Kelley	Hammarlund Super-Pro 200
Charles F. Gramm	Plate transformers
Edward Benoit	National RAO 7/9 receiver
Tom Rosica, W2GIR	1923 Neutrodyne, books, much more
Gene Hampsey	Philco 51-1730 radio/phono
George Scholl	Dynakit tube stereo amplifier
Andrew Eggers	Philco radio
Carol Murzin	400 radio tubes, documentation, much more
Richard O'Neill	Several radios
Edward Gable, K2MP	Early automobile radio
Floyd Koontz, WA2WVL	Large 861 TX tube
Joel Swartz	small one inch CRT type TV
Donald McCaughy	Estate of C. Wells of Harvey-Wells, prototypes
Gary Norman, W1PG	Harvey Wells RG-9A, rare general coverage RX
Fred Linn, W9NZF	Cash donation
Bob Cloke (new member)	Cash donation
A. G. Tannenbaum	Cash donation

OTB BACK ISSUES

The following back issues of *The Old Timer's Bulletin* are available at $3.00 each postpaid, with a 20 percent discount for six or more issues and 30 percent off for 12 or more. Please indicate alternative choices when ordering back issues of *OTB*.

—VOLUME AND NUMBER —

25-4 Comet Pro/4-tube superhets/20s tuner
26-1 Cockaday Rcvr/Silver-Marshall/'29 Hartley XMTR
26-2 TTY Perforator/FB7 Receiver/McElroy Championship
26-3 Nation FB7 II/Radio in S. Africa/Mercury Super 10/ Building a 1929 Receiver
26-4 Gilfillan History I/ Sargent Model 11 Receiver
27-1 Gilfillan History II/Schickerling Tubes
28-1 Dynergy AC-Powered Radio/Pilot TC37 TV
28-2 '26 Radiomovies Today/National AGS I
28-3 Dowd Tube Collection/National AGS II
28-4 SE-1950 Radio Compass/National Sliding-Coil Receivers/Collecting Radio Batteries
29-1 Philco 17 Restoration/ZL2JJ '34 Station
29-2 Fada 460 Restoration/3ZO 1922 Station
29-3 Moorhead Tubes I/British '30s TV I
29-4 Moorhead tubes II/British '30s TV II
30-1 GE Octagon TV Set/TR-1 Transistor Clones
30-3 Military Equipment Special-17 pgs. of 48
30-4 Broadcast Receiver Special-12 pgs. of 48
31-1 1903 Ship Station/Spark vs ARC 1912/KWM1
31-2 Minimax/Spkr&Magazine Restoration/ Pushbutton Sets
31-3 Tube Special-19 pgs. of 48
31-4 International Special-11 pgs. of 48
32-1 Early SSB eqpt/AR188/BC-375/1915 Ship Spark XMTR
32-2 Restore 67.5 V Bats/A&B Pwr Sply/WWI Navy Equip.
32-4 Marconi V-24 Valve/HRO in British Army
33-2 40th Anniversary Special ("Best of *OTB* 1960-1982") all 48 pgs. incl. RCA Metal Tubes
33-4 Scott Special Rcvr/National Power Units
34-1 British crystal Sets/National Power Units
34-3 International Special II-20 pgs. of 64
34-4 Bell Labs Transistor Set/"Larkspur" Radios
35-1 Radiola and Aerola Grand/German WWII Magnetrons & Avionics/Tech-Manual Art
35-2 Van Horne Tube Co./Philco TV Designers/Foreign "HROs"/1200- and 1600-series tubes
35-3 Radiola 17 and 18/1929 regen/G&R Valve Co.
35-4 Negatron/Mercury Super 10/The Breting 14/James Millen Memorial Station
36-1 Orrin Dunlap's Lab/Kolster K23/Bush & Lane Radio
36-2 Headset Update Listing
36-3 100 Years of Marconi Radio
36-4 History of Rogers Batteryless Receivers
37-1 T.V.-Dr. Ernest Alexanderson, Part 1
37-2 T.V.-Dr. Ernest Alexanderson, Part 2
37-3 Evolution of the Auto Radio, Part 1
37-4 Reginald A. Fessenden and the Development of Radiotelephony
38-2 deForest Gang Hits Colorado-Part1/Nathan Stubblefield-Forgotten Pioneer of Wireless-Part1
38-3 Early TV Gear/Mahlon Loomis/KWR-37
38-4 Rider VTVM/ Fr. Joseph Murgas/30s Antennas

Voume 39 and 40 — All Issues Available

CUT OR PHOTOCOPY AND MAIL TO ADDRESS BELOW:

ORDER FORM—*AWA REVIEW* AND *OTB*

Please send the following volumes of *The AWA Review*. Pricing, postpaid in U.S. and Canada: Volume 13 (current volume), $19.95; Volume 12, $29.95; Volume 11, $17; Volumes 9 and 10, $13; Volume 8, $9; Volume 6 and 7, $6. Add $5.00 per volume for postpaid shipment elsewhere.

_____ Copies of Vol. 13 _____ Copies of Vol. 10 _____ Copies of Vol. 7

_____ Copies of Vol. 12 _____ Copies of Vol. 8 _____ Copies of Vol. 6

_____ Copies of Vol. 11 _____ Copies of *OTB* Issues at $3 each

(please specify issues by volume and number):

_____

Note: When totaling orders including 6 or more *OTB*s, subtract 20% *from* OTB *total only.*

(1) Pre-Discount Total _____ (2) 20% Bulk *OTB* Discount (if applicable) _____

(3) Total enclosed [(1) minus (2)] _____

Alternate *OTB* Choice(s) _____

Name _____

Address _____

Please make checks payable to AWA. Mail to: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468

THE MUSEUM

Visit our Internet Web site: http://www.antiquewireless.org

AWA Electronic Communication Museum

Free Admission

Location: Village Green, Rts. 5 & 20, Bloomfield, NY.

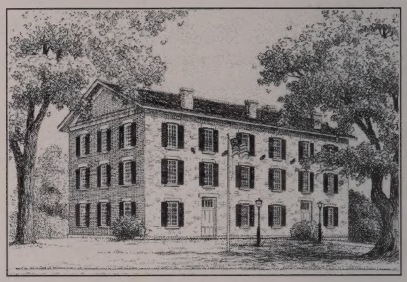
Hours: May 1-Oct. 31 Sunday 2-5 p.m.
June 1-Aug. 31 Saturday 2-4 p.m.
(Closed holidays)

Group Tours: By appointment.

Museum Telephone: (716) 657-6260

Amateur Station: W2AN, W2ICE

Curator: Ed Gable



Mailing Address:
Ed Gable, Curator, AWA Museum,
187 Lighthouse Rd., Hilton, NY 14468
e-mail: k2mp@eznet.net

MUSEUM NEWS

It was really gratifying to see the many happy smiling faces of those visiting their museum during the recent AWA annual conference. Both the Museum and the Annex were buzzing with activity and more than a few people took time to do a little research in the ever-improving Bruce Kelley Memorial Research Library.

I want to thank those who gave so generously those little gems that show up during the convention. I feel the need to recognize a good friend of the AWA, Mr. Mamoru Fujimuro, JA1FC, who each year brings an interesting Japanese tube to the Museum. This year he shared a nice 829B and it was very enjoyable comparing that to the RCA version and studying the differences in manufacturing techniques.

Another interesting collection received was that of Clifford Harvey, W1RF. C. Harvey was the Harvey in Harvey-Wells Manufacturing which is often remembered for the Band Master line of transmitters. And there it was, the prototype or engineering model of the TBS-50, looking very much like the delivered product except for paper labels and evidence of years of circuit changes.

Old timers in AWA will remember Ken Gardner, W2BGN. Ken was an early AWA Board member and was Chief Engineer at WHAM and WHFM. Ken's son has been delivering many items to the museum from Ken and we're delighted to have additional WHAM memorabilia, some historical AWA documentation and a nice selection of deForest and other tubes.

Thanks also to those of you sending cash donations. That works! If you are wanting to do that, be sure to make the check out to AWA Museum.

There has been good weekend museum attendance this year as well as an increase in the number of group tours. Each time we have a tour I wince at some of the older folks struggling to make it up the stairs; ever stronger becomes the need for a handicap accessible facility. All in due time.

The priority now is to complete the per-

(continued on page 70